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# Alaska Pulp Corporation Long-Term Timber Sale Contract

Final Supplement to the  
Environmental Impact Statements  
for the 1981-86 and 1986-90  
Operating Periods

Analysis Area 12: Kuiu Island

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for the 1981-86 and 1986-90 Operating Periods

# **Alaska Pulp Corporation Long-Term Timber Sale Contract**

Analysis Area 12: Kuiu Island

U.S.D.A. - Forest Service  
Alaska Region  
Alaska

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# Abstract

In compliance with the National Environmental Policy Act of 1969 and in response to the Federal District Court cases, *Tenakee Springs v. Courtright* and *Hanlon v. Barton*, the Forest Service has supplemented the Environmental Impact Statements for the 1981-86 and 1986-90 Operating Plans for the APC Long-Term Sale. The Supplement was prepared in two phases. An earlier document, Phase I, provided information and analysis about a number of issues, and proposed four Analysis Areas be further evaluated for timber harvest and road construction through the balance of the Plan period. This document discusses the site-specific environmental impacts for Analysis Area 12 on a portion of Kuiu Island.

This document addresses the issues from the 1986-90 EIS, the appeals issues, and the issues identified in the Court orders and settlement agreements for the above Federal District Court cases. Five alternatives were developed by the Forest Service to address the issues and the contract and Tongass Land Management Plan requirements. The alternatives include the no action-continued direction and no-further-harvest Alternative 1 along with four action alternatives.

Alternative 2 - West Security Bay proposes to harvest 87.4 million board feet (MMBF) and construct 27.2 miles of new road, while Alternative 3 - No Name Bay proposes to harvest 124.8 MMBF and construct 37.3 miles of new road. Alternative 4 - North Kuiu proposes to harvest 93.8 MMBF and construct 23.4 miles of new road. Alternative 5 - Threemile Arm proposes to harvest 105.3 MMBF and construct 29.6 miles of new road. All of the alternatives would use the existing log transfer facility (LTF) and logging camp at Rowan Bay; Alternative 3 proposes to also build a new LTF at No Name Bay and connect it to the road system including the Rowan Bay LTF.

The analysis of effects concludes that any of the five alternatives would have minimal impacts on the environment; these impacts fall within the guidelines of the Tongass Land Management Plan and other requirements. Likewise, the alternatives were found to be similar in addressing the issues, except for economic benefits where the no-action Alternative 1 would have detrimental effects on the local economy as a result of foregoing timber harvest. The action Alternatives 2, 3, 4, and 5 would have beneficial effects related to the amount of volume proposed for harvest, with Alternative 3 resulting in the most benefits to the local economy. The ANILCA Section 810 Subsistence Evaluation concluded that none of the alternatives would cause an immediate or reasonably foreseeable significant possibility of a significant restriction on subsistence use. The analysis did conclude that long-term cumulative effects of reasonably foreseeable activities may possibly restrict subsistence use. Subsistence hearings were held in conformance with Section 810 of ANILCA. Based on the results of the EIS, the Forest Service recommends Alternative 5 as the preferred alternative, pending further consideration in the Record of Decision.





# Summary

In 1956, the Forest Service and Alaska Lumber and Pulp, now Alaska Pulp Corporation (APC), entered into a timber sale contract that terminates in 2011. Every five years since implementation of the National Environmental Policy Act (NEPA), the Forest Service has prepared an environmental impact statement (EIS) for the succeeding Five-Year Operating Plan.

The Federal District Court Case, *Tenakee Springs v. Courtright*, challenged the adequacy of the 1981-86 Operating Plan EIS under NEPA. In a 1987 decision, the Court found that the Forest Service would need to prepare a supplement to the 1981-86 EIS to address issues raised by departures from the original 1981-86 Operating Plan. The departures have included the deletion or deferral of harvest units on lands selected for conveyance to Native corporations under the Alaska Native Claims Settlement Act (ANCSA) of 1971.

In addition to changing the Operating Plan, the Court identified three other issues requiring further analysis including: the need to consider a no-action alternative specific to the Upper Game Creek area of Chichagof Island, the need for more site-specific detail regarding environmental effects of alternate road and harvest configurations in the upper Game Creek area, and additional analysis in the Upper Game Creek area of the foreseeable cumulative impacts on the environment resulting from an expanding network of roads and harvest units.

The Forest Service decided to supplement both the 1981-86 and 1986-90 EISs because both documents analyzed many of the same harvest areas and dealt with the same issues, and reanalysis of issues in the 1981-86 EIS could affect the same issues in the 1986-90 EIS. The Notice of Intent to produce the Supplemental EISs was published in the Federal Register October 15, 1987.

The EIS Supplement has been prepared in two phases. Phase I provided information and analysis of the issues, narrowing the focus from the whole APC Long-term Timber Sale area to four specific Analysis Areas, 2, 3, 6, and 12, that should be further evaluated for timber harvest and road construction through the balance of the Plan period ending December 31, 1990. This document presents site-specific environmental impacts of proposed roads and harvest units for a portion of Kuiu Island, designated as Analysis Area 12.

This document uses four main chapters to discuss the purpose and need for supplementing the previous EISs, the alternatives including the proposed action, the existing conditions of the affected environment, and the environmental consequences of the alternatives as well as measures to mitigate adverse effects. A number of appendices contain supporting materials.

On the basis of the Phase I and Phase II SEIS analysis, the Regional Forester must decide:

- Whether or not the changes in land ownership, deferrals, deletions, or changes of timber-harvest units, and the effects of the Alaska National Interest Lands Conservation Act (ANILCA) subsistence legislation warrant amending the Records of Decision for the 1981-86 or 1986-90 FEISs.
- Whether or not the contractual timber commitments between the date of publication of this document and the end of the 1986-90 Operating Period should be met from Value Comparison Units (VCUs) that have some existing access roads and harvest units.
- If the contractual commitments are not met from previously roaded VCUs, how much additional timber will be needed and from which VCUs the timber harvest will be scheduled.

The issues discussed in the 1981-86 and 1986-90 EISs include:

1. The socioeconomic effects of logging and associated development on employment, business, populations, and quality of life.
2. The costs and benefits or trade-offs between environmental protection measures and the economics of the harvest activities.
3. The effects of timber harvest activities on fish habitat.
4. The effects of timber harvest activities on wildlife habitat.
5. The distribution of harvest by volume class.
6. The locations and environmental effects of log transfer facilities.
7. Maintaining resource values in high interest areas noted for fisheries, wildlife, recreation, or other values.
8. Effects on visual, recreation, and wilderness resources.

Other issues specified by the Court during the appeals process include consideration of a no-action alternative, consideration of effects on subsistence pursuant to Section 810 of ANILCA, and consideration of foreseeable long-term and cumulative effects of timber harvest. In 1988, a case (*Hanlon v. Barton*) filed in Federal District Court raised several issues regarding the effects of timber harvest near Hoonah on subsistence users. The Court recognized the merit of some claims, which have implications for Analysis Area 12: consideration of a no-further-harvest alternative and consideration of “carryover” logging and road construction.

To address the issues and comply with NEPA regulations while meeting the APC Contract requirements, the Forest Service developed five alternatives for the Analysis Area 12 Draft SEIS. Alternative 1, the No Action/Current Direction/No Further Harvest option, would permit the activities currently authorized by the Court to continue in nondeferred VCUs. Alternative 2 - West Security Bay proposes to harvest 87.4 MMBF, construct 27.2 miles of system roads, and use the existing log transfer facilities and logging camp at Rowan Bay. Alternative 3 - No Name Bay proposes to harvest 124.8 MMBF, construct 37.3 miles of new road, and construct a new log transfer facility and logging camp at No Name Bay.

Alternative 4 - North Kuiu proposes to harvest 93.8 MMBF, construct 23.4 miles of new road, and use the existing log transfer facilities and camp at Rowan Bay. Alternative 5 - Threemile Arm proposes to harvest 105.3 MMBF, construct 29.6 miles of new road, and use the existing log transfer facilities and camp at Rowan Bay.

Alternative 1, the no action alternative, would have no additional environmental impacts. None of the action alternatives would locate roads or units on high hazard soils; each of the alternatives would disturb soils on about 5 to 10 percent of most harvest units. The alternatives would alter noncommercial and understory species composition, but not to a significant extent. Planting and precommercial thinning would be scheduled to accelerate both understory and remaining conifer growth rates for longer periods of time.

None of the action alternatives would affect eagle trees, and only Alternative 2 would affect beach fringe or estuarine fringe habitat. The alternatives would impact between 0.4 percent (Alternatives 4 and 5) and 0.7 percent (Alternative 2) of existing deer winter range. While Alternative 2 would not affect inland wetlands, the other alternatives would impact between 0.3 (Alternative 4) and 1.3 (Alternative 3) percent. The alternatives would impact between 0.5 percent (Alternatives 2, 3, and 4) and 0.9 percent (Alternative 5) of streamside/riparian zones.

For all alternatives, AHMU buffers of 100 feet will be maintained on Class I and II streams, except one unit each in VCUs 417 and 419, which have 50 foot buffers. The alternatives



would involve from one (Alternative 2) to four (Alternative 3) Class I stream crossings. None of the alternatives would affect more than 1.3 percent of available Class I and Class II fisheries habitat. Likewise, all of the alternatives would result in a low potential for increased stream runoff. Application of standards and guidelines is expected to minimize erosion impacts.

While Alternatives 2, 4, and 5 would not change the marine environment, Alternative 3 would construct a log transfer facility at No Name Bay, with minor impacts on marine life. None of the alternatives would affect land status. Alternative 2 would affect recreation opportunities west of Security Bay; Alternatives 4 and 5 would affect areas near Kadake Creek with the latter extending road construction around Threemile arm. Alternative 3 would have the most effects on recreation, shifting East Kuiu from primitive/pristine opportunities to a roaded setting, removing an anchorage in No Name Bay, and harvesting areas along Kadake Creek.

The alternatives fail to meet assigned visual quality objectives in a few VCUs ranging from one (Alternative 4) to three (Alternative 3). No known cultural resource sites will be affected by the alternatives. The Forest Service would conduct inventory, evaluation, and mitigation of cultural resources sites pursuant to an agreement with the state Historic Preservation Officer, to avoid adverse impacts under any alternative adopted in the ROD

A Subsistence Evaluation was conducted pursuant to ANILCA Section 810, including public hearings held in subsistence communities in the vicinity of Analysis Area 12. It found that none of the Analysis Area 12 alternatives would cause an immediate or reasonably foreseeable significant possibility of a significant restriction of subsistence use of wildlife, fish and shellfish, or other food resources. The evaluation further found that enough is known about foreseeable, programmatic Forest Service activities and foreseeable other potential activities to project that the cumulative effects may possibly restrict subsistence uses..

The action alternatives were found to be similar in evaluating most of the issues. Most of the issues concern environmental impacts, including effects on fish and wildlife habitat and the marine environment, visual resources, recreation, wilderness, and high interest areas, which were concluded to be minimal. The analysis found that none of the action alternatives would harvest a significant amount or percentage of high volume stands.

Chapter 4 of the document identifies numerous measures applied to mitigate the adverse impacts of timber harvest activities. These measures are used to protect or enhance fish and wildlife habitat, protect aesthetic values, prevent landslides and windthrow, and improve timber stands. Various Forest Service documents have discussed the standards, guidelines, monitoring, and mitigation measures in detail. Their purpose is to foresee and avoid or prevent potential problems in the planning phases of forest management. The potential effectiveness of proposed mitigation measures is also discussed.

Mitigation measures identified in Chapter 4 include, for example, creating irregular unit boundaries on visually sensitive units, using log yarding suspension requirements to protect sensitive soils, and providing signs to direct recreation traffic along the trails affected by harvest activities. Other mitigation measures consist of monitoring recreation use to determine the need for access restrictions, using streambank protection measures to maintain stable stream channels, using second-growth management techniques for areas of harvested deer winter range, and avoiding known cultural resources sites.

The alternatives differ considerably in economic benefits. The no action Alternative 1 would result in a potential loss of some 417 jobs, and about \$9.6 million in salaries for the 49 MMBF of volume not harvested. By contrast, Alternative 2 would maintain 743 jobs and about \$17.2 million in salaries. Alternative 4 would maintain 797 jobs and \$18.5 million in salaries. Alternative 5 would maintain 895 jobs and about \$20.8 million in salaries. Alternative 3 would maintain 1061 jobs and about \$24.6 million in salaries.

Selection of the no action Alternative 1 would close, for a period of time, the Rowan Bay logging camp and relocate its 134 residents. Alternative 1 would also reduce the supply of wood to the Wrangell mill, resulting in a loss of about 80 jobs, and reduce the supply of pulp to the APC mill in Sitka. This alternative would require the Forest Service to provide sufficient volume in other parts of the APC Contract area, and probably would cause the Forest Service to breach contractual obligations.

The volume harvested under Alternative 2 is in the low range of that projected in Phase I of the SEIS. This alternative is considered to be low to moderate in effectiveness to implement TLMP guidelines for LUD IV VCUs. Because it proposes harvest within the viewshed of a state marine park, there may be public controversy over the alternative.

Alternative 3 proposes to construct the No Name Bay LTF and connect the road system between Rowan Bay and No Name Bay. It is rated highest in meeting APC contractual volume needs projected in Phase I of the SEIS. This alternative proposes activities in No Name Bay, Alvin Bay, and Seclusion Harbor, which were identified as moratorium areas in proposed House Bill 1516 and more recently proposed for wilderness in House Bill 987. Public concern exists over construction of a LTF in No Name Bay.

Alternative 4 is rated moderate in effectiveness in terms of implementing guidelines in a LUD IV area and providing the middle range of volume for APC contractual needs. Alternative 4 proposes no harvest in areas of known controversy and construction of road into previously unroaded areas is minimized. Alternative 5 is the same as Alternative 4 except for adding road construction and harvest units along a portion of Threemile Arm. It would provide volume at the upper end of the range projected to meet APC contractual obligations.

The Stikine Area management team evaluated the benefits and impacts of each alternative against the issues to recommend the preferred alternative. Alternative 5 is tentatively identified as the preferred alternative, pending further consideration in the Record of Decision.

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# Chapter 1

## Purpose and Need





# Chapter 1

## Purpose and Need

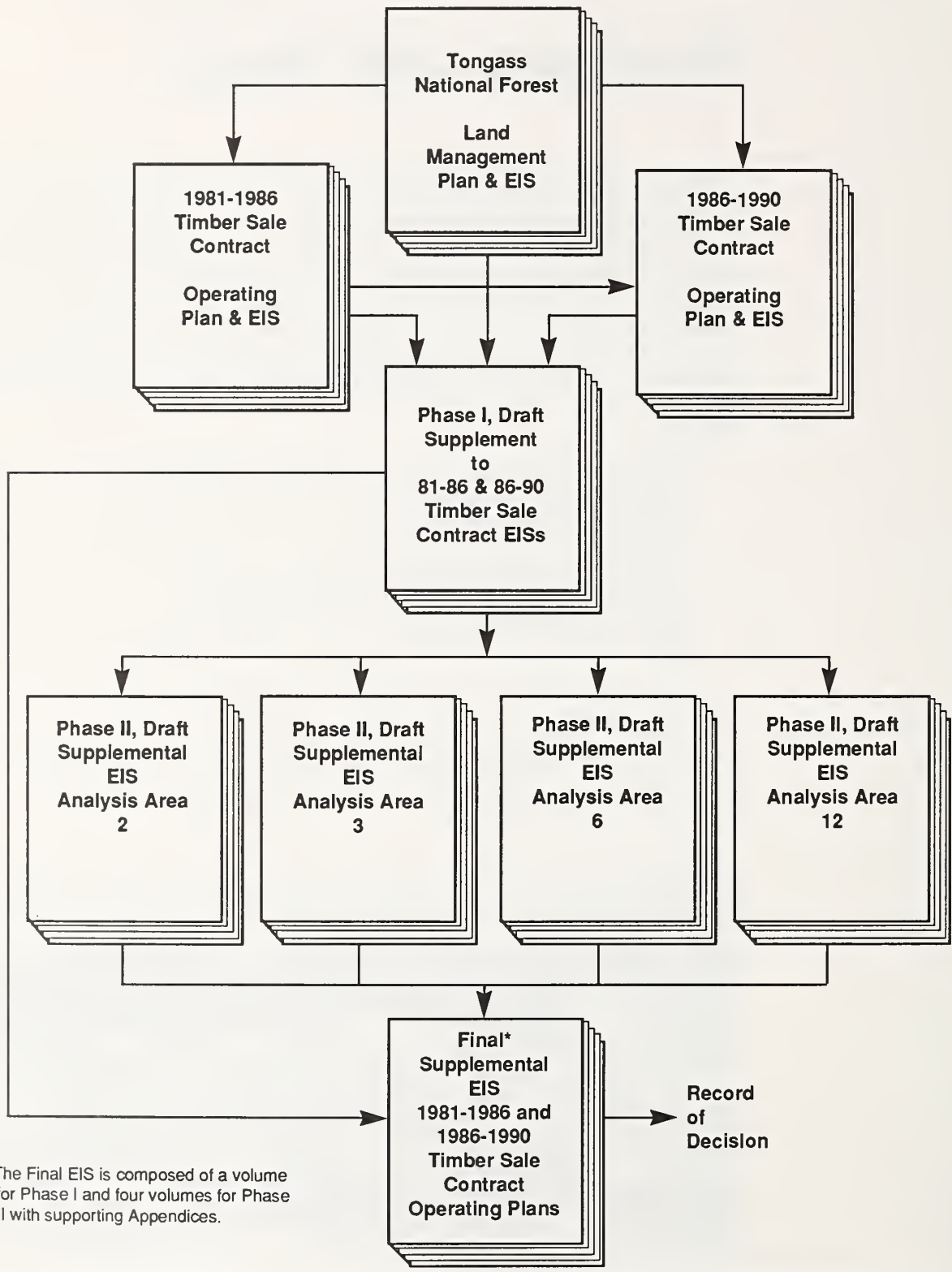
This is one of four Phase II documents describing further environmental analysis conducted to supplement information previously provided in the Environmental Impact Statements (EISs) for the 1981-86 and 1986-90 Operating Periods for the Alaska Pulp Corporation (APC) Long-Term Timber Sale Contract. This Phase II document addresses site-specific environmental impacts attributable to road construction and timber harvest for a portion of Kuiu Island. This supplemental document is “tiered” to previous documents, which means that it builds on the analysis of the earlier documents. The information from the previous documents is hereby incorporated by reference and only significant conclusions or analyses from them are summarized here. The relationship or tiering of this document to earlier ones is shown in Figure 1-1. The reader is referred to the documents listed below for many of the details of ongoing issue discussions:

1. Alaska Pulp Corporation Long-Term Timber Sale Contract, Draft Supplement to the Environmental Impact Statements for the 1981-86 and 1986-90 Operating Periods, Phase I, August 1988 (Forest Service 1988a).
2. Notice of Intent to prepare a supplement to Environmental Impact Statements, published in the Federal Register on October 15, 1987 (Barton 1987).
3. Alaska Lumber and Pulp Company 1981-86 Operating Plan FEIS, 1980 (Forest Service 1980).
4. Alaska Pulp Corporation 1986-90 Operating Period FEIS, 1986 (1986-90 FEIS) (Forest Service 1986b).
5. Tongass Land Management Plan (TLMP) and Final EIS, 1979 (Forest Service 1979).
6. Tongass Land Management Plan, Amended, 1986 (Forest Service 1986d).

*Kake, Alaska, Early 1900s*



Figure 1-1  
The Relationship of this Supplemental Environmental Impact Statement to Earlier Documents



\*The Final EIS is composed of a volume for Phase I and four volumes for Phase II with supporting Appendices.





7. Alaska Regional Guide, November 1983 (incorporated by reference into the Tongass Land Management Plan) (Forest Service 1983).
8. Alaska Lumber and Pulp Company Timber Sale Contract; Contract Number 12-11-010-1545, 1956, with the Washington Office, Forest Service, Washington, D.C. (Forest Service 1956).

The supplement to the 1981-86 and 1986-90 FEISs (the SEIS) has been divided into two phases. Phase I concluded that there was not sufficient volume available from non-deferred harvest units to meet the Forest Service's contractual obligations to APC in the APC contract area (Figure 1-2). Phase I, therefore identified four specific geographic areas or analysis areas (Figure 1-3) for further analysis in Phase II. The Phase II SEISs document site-specific environmental impacts that would be caused by road construction and timber harvest in the four analysis areas that should be entered by December 31, 1990 and compares a no-action alternative. This document addresses the Phase II studies for the portion of Kuiu Island designated as Analysis Area 12.

This document, the Phase II SEIS for Analysis Area 12, is divided into four main chapters, as shown in Figure 1-4. Supporting material is included in appendices. Chapter 1, Purpose and Need, presents (1) a summary of the historical background for the reviewer to better understand the purpose of and need for supplementing the previous EISs and (2) the issues that were identified and are addressed in the following chapters. Chapter 2, Alternatives Including the Proposed Action, describes and compares the alternatives specifically developed to resolve the issues described in Chapter 1 and fulfill the APC Long-Term Contract. Chapter 3, Affected Environment, describes the existing conditions of the environment that would be affected by the actions associated with the alternatives. Chapter 4, Environmental Consequences, describes the potential consequences, or impacts, to that environment.

## Definitions

The majority of project-specific terms and acronyms are defined in the glossary in this document. However, clarification should be made on a few terms of geographical land subunits in the Tongass National Forest used by the Forest Service for administrative management: Value Comparison Unit (VCU), deferred and nondeferred VCUs, Management Area, and Analysis Area. Figure 1-5 illustrates the hierarchical relationships of these subunits.

Value comparison units have been established in the Tongass National Forest in order to facilitate the use of a common set of resource inventories and interpretations of resource

# 1 Purpose and Need

Figure 1-2

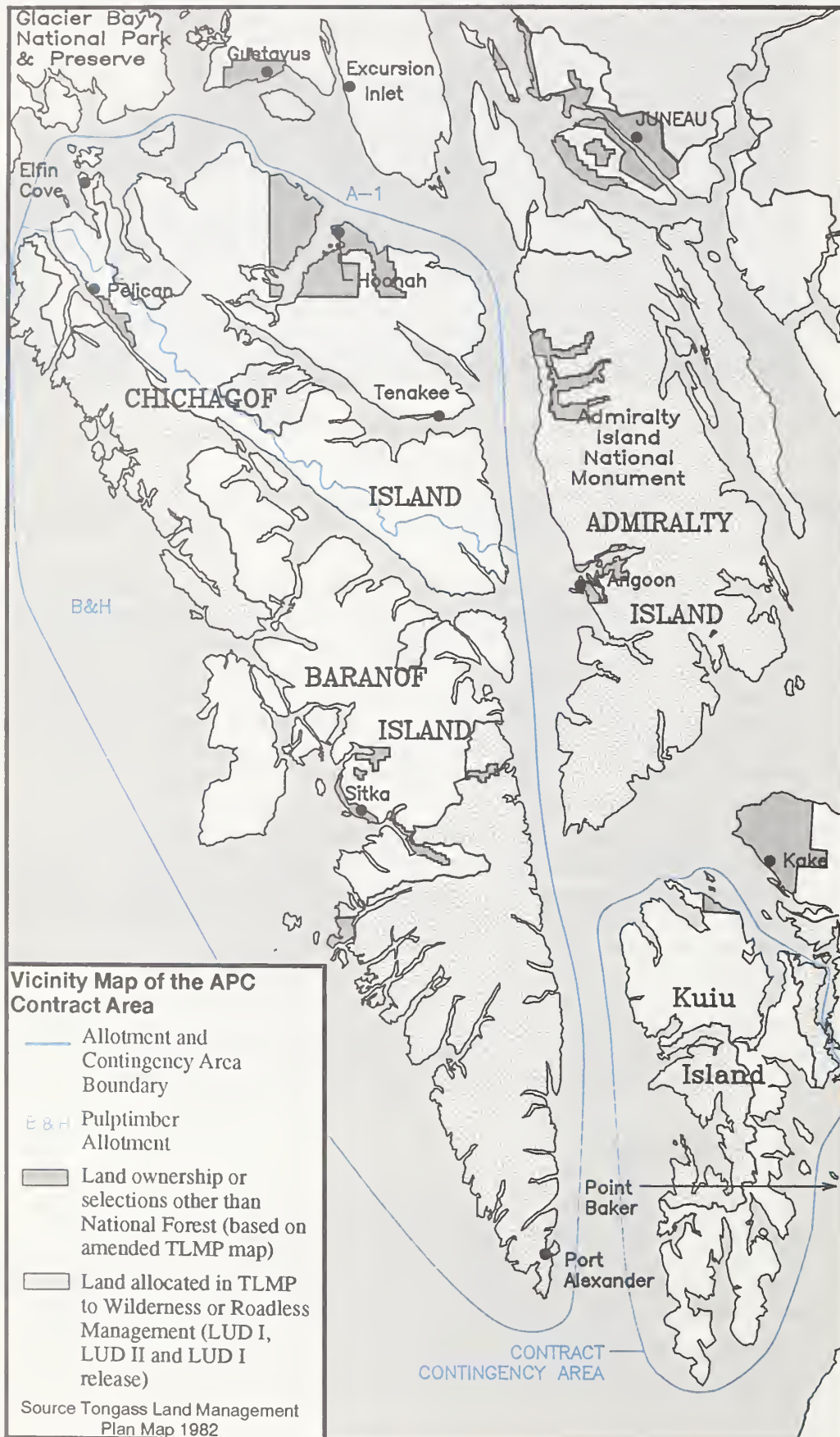




Figure 1-3

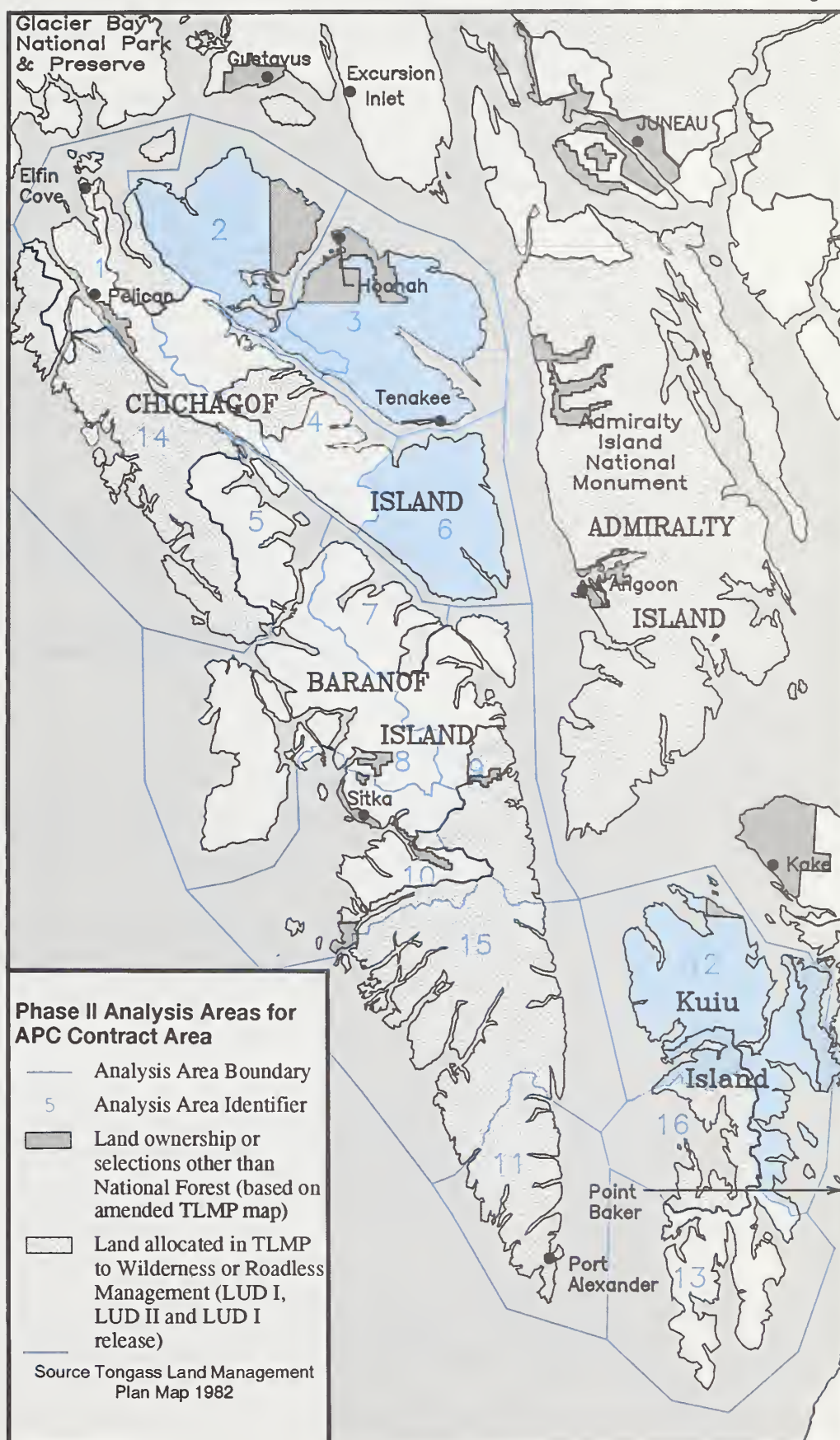
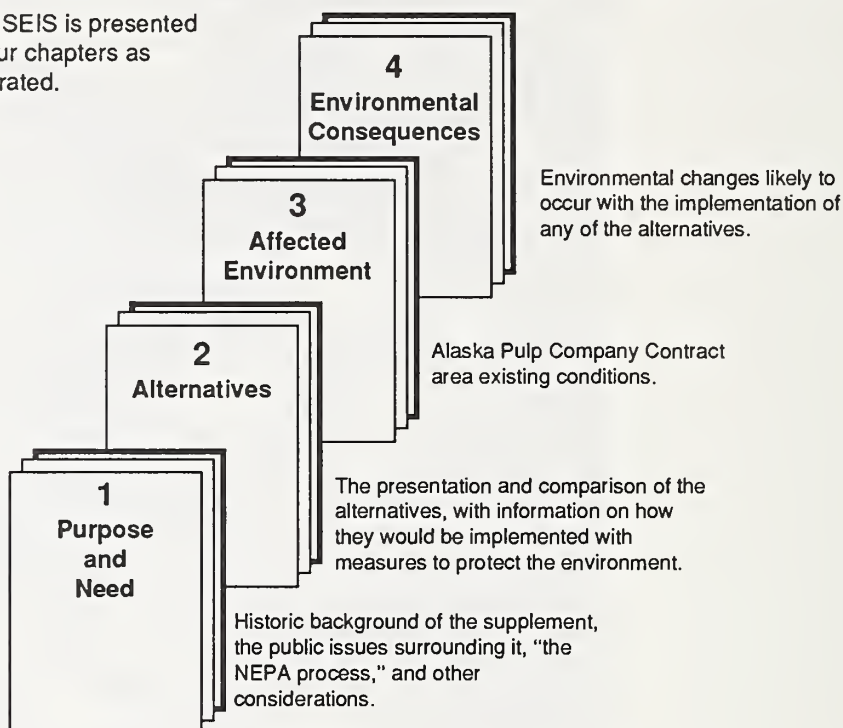


Figure 1-4

## How this Supplemental Environmental Impact Statement is Organized

This SEIS is presented in four chapters as illustrated.



values for management purposes. A VCU is used as a planning unit and is defined as a geographically distinct area that generally encompasses a drainage basin containing one or more large stream systems. The boundaries of a VCU usually follow easily recognizable watershed divides. In some cases, an island or a group of small islands comprise a single VCU. The VCUs average about 17,500 acres in size, Forest wide.

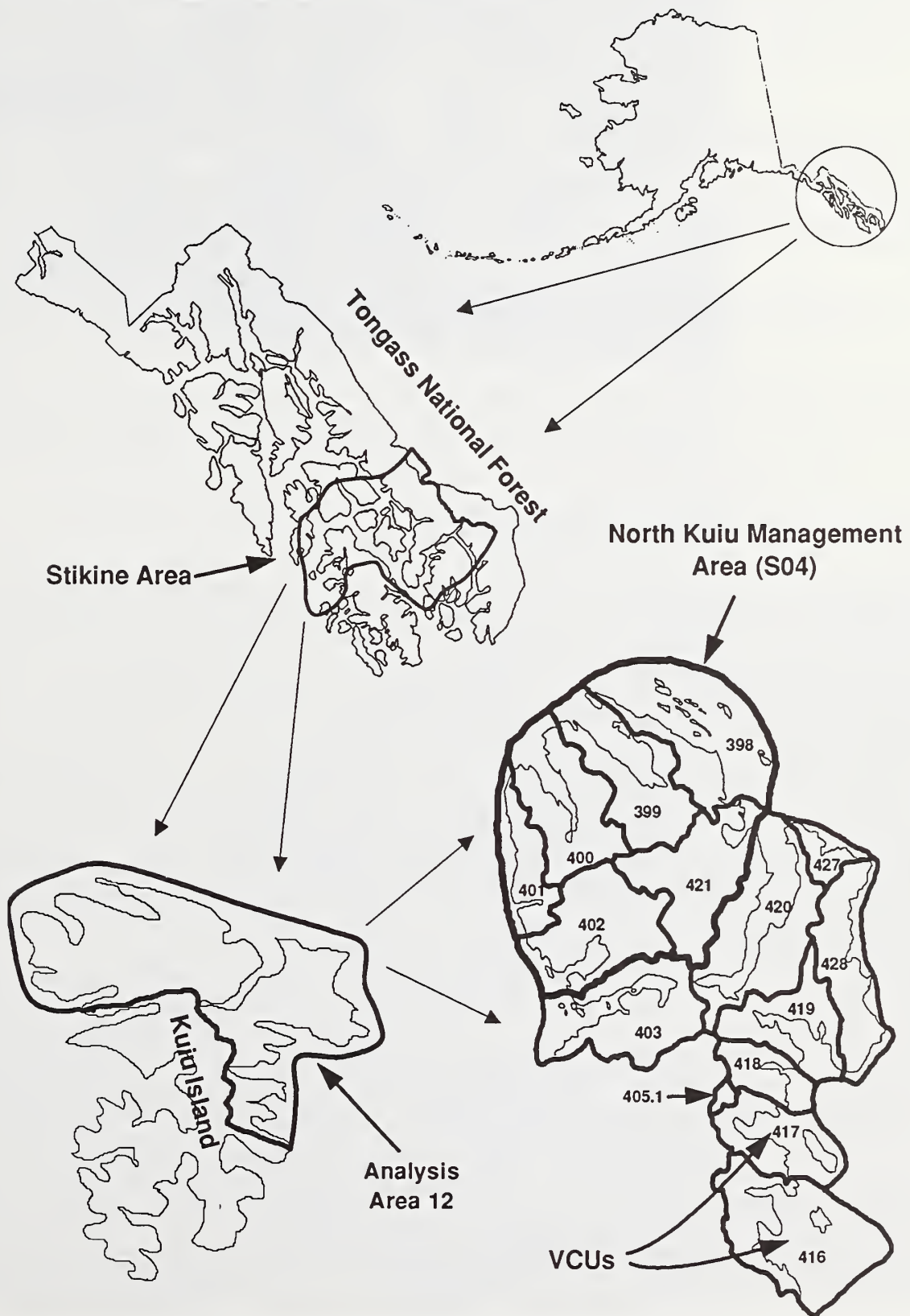
A deferred VCU is one in which further road construction and/or timber harvest is postponed pending completion of the supplement (Settlement Agreement, April 1988). All deferred VCUs are listed in the Notice of Intent (September 1987). The deferred VCUs in Analysis Area 12 are VCUs 416, 417, and 418. Two additional VCUs are partially deferred. In VCUs 419 and 420, the deferred parts are north of the roads and harvest units authorized in the 1986-90 Plan FEIS.

A nondeferred VCU is one in which timber harvest and road construction may proceed as scheduled in the 1981-86 and 1986-90 Operating Plans without being further evaluated in the SEIS (Settlement Agreement, April 1988). Additional harvest units and access roads will be considered in nondeferred VCUs as an alternative to entry into deferred VCUs. The nondeferred VCUs in the Analysis Area 12 are VCUs 398, 399, 400, 402, and 421. The nondeferred parts of VCUs 419 and 420 are south of the roads and harvest units authorized in the 1986-90 FEIS.

Management areas, larger planning units identified in the Tongass Land Management Plan (Forest Service 1979, 1986d), provide a broader perspective for forest management decisions. Management areas are composed of VCUs that have similar resource and physical allocations.



Figure 1-5  
Geographical and Management Subunits





Analysis areas generally are combinations of two or more management areas. The grouping of management areas is consistent with the direction found in the 1980-86 Tongass Land Management Plan Amendment (Forest Service 1986d) and is discussed in SEIS Phase I, Chapter 2.

## Background

In 1956, Alaska Lumber and Pulp, now Alaska Pulp Corporation (APC), entered into a contract with the Federal government prescribing terms for timber sales and logging in Southeast Alaska for a 50-year period between 1961 and 2011 (Forest Service 1956). During that period, the contract provides for harvesting 4,974,700,000 board feet of sawlog grade timber within the sale, or contract area (Figure 1-2), which includes parts of Baranof, Chichagof, Kuiu, and associated islands.

Since 1971, the Forest Service, United States Department of Agriculture, has specifically planned and authorized logging, road construction, and related activities for successive five-year periods. The Forest Service has determined that these five-year Operating Plans are major federal actions significantly affecting the human environment, thus requiring preparation of an EIS under the National Environmental Policy Act (NEPA). Since the enactment of NEPA, an EIS has been prepared for each succeeding five-year Operating Plan. The EISs evaluate the proposed actions and the potential effects the Operating Plans may have upon the environment.

The Alaska Native Claims Settlement Act (ANCSA) (85 Stat. 688, as amended), was approved December 18, 1971 to provide for the settlement of certain land claims of Alaska natives. ANCSA has been the basis for conveying selected lands under administrative jurisdiction of the Tongass National Forest to Native corporations (any regional, village or urban corporation, or Native group). Under ANCSA, Native corporations have selected over 500,000 acres from the Tongass National Forest, but not all of the land has been conveyed to them. The selected and yet unconveyed lands remain in a state of suspension, unavailable for corporation management and restricted from public management. Less than 50 acres in Analysis Area 12 of the APC Long-Term Timber Sale area were selected and became unavailable to provide timber under the contract.

On December 2, 1980, the Alaska National Interest Lands Conservation Act (ANILCA), Public Law 96-487, was enacted to provide for the designation and conservation of certain public lands in the State of Alaska. This act established a number of areas for the purpose of



preserving them for the benefit, use, education, and inspiration of present and future generations. Title VII of the Act resulted in 550,200 acres or about 15 percent of the Stikine Administrative Area (which includes Analysis Area 12) becoming wilderness. Title VIII of the Act addressed the use of public lands for subsistence uses; the customary and traditional uses by rural Alaska residents of wild, renewable resources. In addition, Section 705(a) of the Act provided funding to maintain a timber supply from the Tongass National Forest of 4.5 billion board feet per decade.

The enactment of ANILCA and ANCSA changed the status of land administration in the Tongass National Forest. The Record of Decision for the 1981-86 Operating Period Plan was signed April 11, 1980 with an implementation date of January 1, 1981. The Court case *Tenakee Springs v. Courtright* challenged the adequacy of the Final EIS for the 1981-86 Operating Plan. In a Memorandum and Order (June 26, 1987) the Court concluded that the EIS for the 1981-86 Operating Period required supplementation because of the following issues:

1. Since preparation of the EIS for the 1981-86 Operating Period, actions related to ANCSA have resulted in the deletion or deferral of harvest units, thereby changing the Operating Plan.
2. Consideration of a no-action alternative specific to Upper Game Creek (Chichagof Island) is required.
3. Inadequate site-specific detail was provided regarding environmental effects of alternate road and harvest configurations in the Upper Game Creek area.
4. Additional analysis in the Upper Game Creek area may be necessary if land conveyances to Native Corporations change the management practices on neighboring lands, and consideration is necessary of the foreseeable cumulative impacts on the environment due

Upper Game Creek



# 1 Purpose and Need

Rowan Bay Logging  
Kuiu, 1988



to a steadily expanding network of roads and harvest units in the vicinity of Upper Game Creek.

In the Memorandum and Order, the Court required the preparation of a supplement to the EIS for the 1981-86 Operating Period to improve the site-specific analysis of the Upper Game Creek area and address the other issues raised. The Court prohibited road construction and logging operations in that area pending completion of the supplemental analysis.

In July of 1987, the City of Tenakee Springs and others filed for a temporary restraining order and preliminary injunction against logging operations in the East Kuiu Management Area (*Tenakee Springs v. Courtright* 1987b). The motion was denied.

A Settlement Agreement in the *Tenakee Springs v. Courtright* case was filed April 20, 1988. As a part of the Settlement Agreement the Forest Service agreed to prepare a supplement to the EIS for the 1981-86 Operating Period. The Settlement Agreement deferred road construction and timber harvest in certain areas (deferred areas) and authorized activities to proceed in other areas (nondeferred areas) without further consideration in the supplement.

The Forest Service published a Notice of Intent in the Federal Register on October 15, 1987, to announce the preparation of a supplement to the EISs for both the 1981-86 and 1986-90 Operating Periods. The issues identified by the Court and other issues of concern to the Plaintiffs in the *Tenakee Springs v. Courtright* lawsuit not only pertain to the EIS for the 1981-86 Operating Period, but extend to areas included in the EIS for the 1986-90 Operating Period, since many of the same timber-harvest areas were analyzed in both EISs and many of the same issues were addressed in each Operating Period. There was a need to further address the issues pertaining to both the 1981-86 and 1986-90 Operating Period EISs because of new information and circumstances. For example, the Court identified Upper Game Creek as requiring more site-specific analysis, analysis of a no-action alternative, and discussion of foreseeable cumulative effects. However, the same arguments can apply to any similar geographic unit or local project. Therefore, the Notice of Intent stated that the Supplement



process will evaluate a no-action alternative specific to each drainage or similar geographic area and will include the following three issues:

1. Additional analysis will be conducted on site-specific and cumulative environmental impacts associated with alternative road and timber harvest configurations included in the 1981-86 and 1986-90 Operating Plans (equivalent to the Court decision requirements for Upper Game Creek).
2. Analysis will be conducted of the effect on subsistence resources and uses in relation to alternatives considered in the SEIS pursuant to Section 810 of ANILCA. (Subsistence was not separately considered in the 1981-86 FEIS because ANILCA was enacted after approval of that EIS. Subsistence was analyzed in the 1986-90 FEIS.)
3. Mitigation measures will be developed and evaluated for the alternatives considered in the SEIS.

The Phase I Draft SEIS was issued for review in August of 1988. Comments received are addressed in the Supplement process and are responded to in the Final SEIS as are the comments that have been received for the Phase II Draft SEIS.

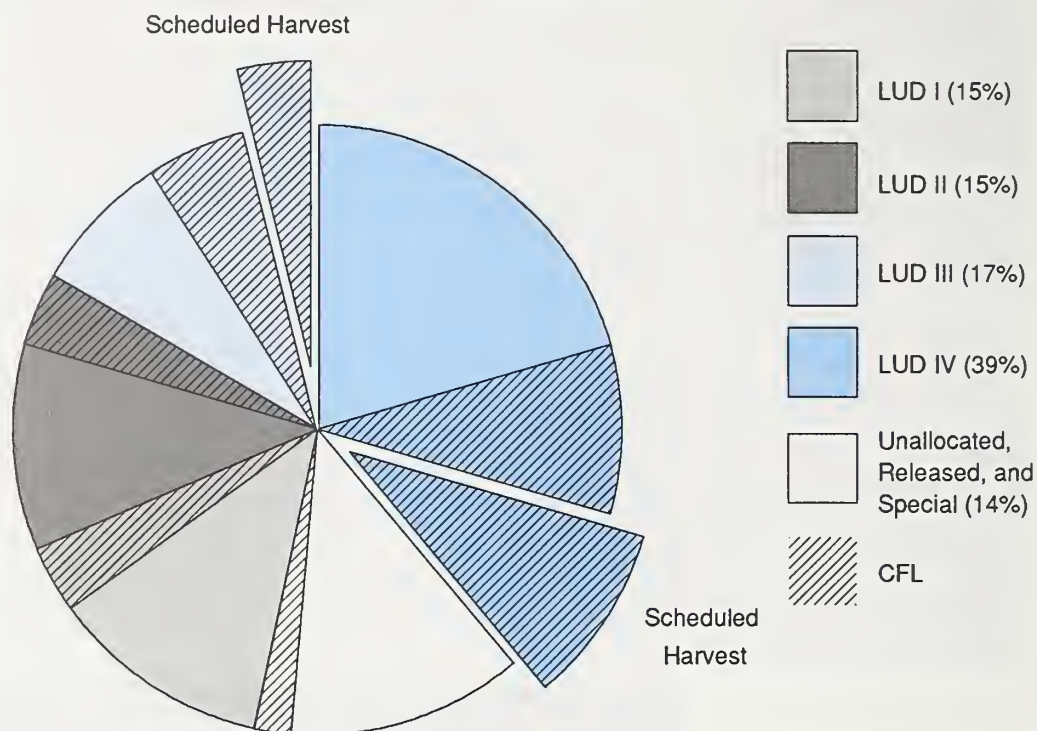
On July 31, 1988, several residents of Hoonah, Alaska, and others filed a lawsuit (*Hanlon v. Barton*) challenging the adequacy of the 1986-90 Plan FEIS with respect to activities planned near Hoonah. They claimed that activities proposed in the 1986-90 Operating Plan would significantly restrict subsistence uses, that evaluations of environmental and subsistence values were not site-specific, that the Forest Service must evaluate cumulative subsistence impacts of reasonably foreseeable future actions, that the Forest Service failed to consider a no-action alternative, and that there was a failure to evaluate impacts of "carryover" logging





Figure 1-6

## Distribution of Land Use Designations (LUDs), Commercial Forest Land, and Scheduled Timber Harvest<sup>1</sup> in the Stikine Area<sup>2</sup>



<sup>1</sup> Scheduled timber harvest refers to Tongass Land Management Plan projections for the whole tree crop rotation.

<sup>2</sup> From the current Tongass Land Management Plan (Forest Service 1986d)

and road construction. On November 14, 1988, the Court denied a motion for preliminary injunction, but recognized the merit of some claims. Three of these claims have implications for Analysis Area 12; consideration of a no-action alternative, consideration of carryover logging and road construction, and subsistence evaluations.

The 101st Congress is considering legislation known as the "Tongass Timber Reform Act". The House of Representatives passed H.R. 987 on July 13, 1989, and the Senate is reviewing a similar bill, S.B. 346, at the time of this writing. As passed by the House of Representatives, that legislation would cancel the long-term timber sale contracts with the Alaska Pulp Corporation and the Ketchikan Pulp Company. It would also require "a buffer zone of a minimum of 100 feet in width within which logging shall be prohibited on each side of all anadromous fish streams in the Tongass National Forest, and their tributaries, except those tributaries with no resident fish populations which are intermittent in flow, or have flow of inadequate magnitude to directly influence downstream fish habitat." Other provisions of this bill include prohibiting a road connection between the Indian River and Game Creek road systems, certain other management directions, and designation of 23 additional areas as wilderness. Six of the 23 areas are within the APC long-term contract area. Portions of the proposed Rocky Pass Wilderness and most of the proposed South Kuiu Wilderness are within Analysis Area 12.

### Kuiu Islands Fish Enhancement Project



## Management of the Analysis Area

As previously stated, this document is the Phase II SEIS for Analysis Area 12, which is located on Kuiu Island. Analysis Area 12 has approximately 295,596 acres in National Forest ownership and is administered by the Stikine Area Office of the Tongass National Forest in Petersburg. It includes four management areas and 15 VCUs as designated in the current Tongass Land Management Plan (Forest Service 1986d) as follows:

- North Kuiu Management Area S04: VCUs 398, 399, 400, 401, 402, and 421 (LUD IV)
- Pillars Management Area S05: VCU 403 (LUD II)
- East Kuiu Management Area S09: VCUs 405.1 (LUD I Release); 416, 417, 418, 419, and 420 (LUD IV)
- Rocky Pass (partial) Management Area S12: VCUs 427 and 428 (LUD II)

The current Tongass Land Management Plan (Forest Service 1986d) divided the forest land into four Land Use Designations (LUDs) and defined the purposes and management implications of each. Areas designated as LUD I were suitable for recommendation for inclusion in the National Wilderness System and are managed as such. Land Use Designation II areas are generally maintained in a roadless state, but with fewer restrictions than LUD I lands. No commercial timber harvest is allowed on either LUD I or LUD II lands. The LUD III designated areas are managed for both amenity values (e.g., scenic and recreational uses) and commodity-oriented uses (e.g., timber harvest) in a compatible manner to provide the greatest combination of benefits. Such areas usually have high values of both types. The lands designated as LUD IV provide opportunities for intensive development of resources. These areas are managed in favor of commodity production (e.g. timber production) while protecting the long-term physical and biological productivity. The relative distribution of these LUDs in the Stikine Area is illustrated in Figure 1-6.

The current Tongass Land Management Plan designated the North Kuiu Management Area (S04) as a LUD IV area. The management direction or emphasis specified in the Plan is to



Rowan Bay Logging 1988

Bay of Pillars, Old Cannery Site







*Ship Being Loaded, APC Pulp Plant, Sitka, Alaska*

support a substantial portion of the Alaska Pulp Company's pulp wood requirements under the long-term timber sale using normal or modified timber management practices. Over the long term, minerals, sport and commercial fisheries, and recreation, including commercial recreation opportunities, will receive increasing management emphasis as demand increases. The Plan scheduled activities related to the long-term harvest of timber in all the VCUs of this Management Area, except VCU 401, in the 1985-89 period and in the future. The planned activities include construction of 177 miles of road as part of an interconnected road system throughout the island.

The East Kuiu Management Area (S09) is also designated as a LUD IV area. The management direction in the current Tongass Land Management Plan includes the western part of VCU 420 within the primary harvest area and the rest of the Management Area in the contingency area of the long-term timber sale. The Plan projects that most of the area will be accessible by road and that one or more additional log transfer facilities will be required for overall efficiency of the long-term timber harvest. The Plan scheduled activities related to both short-term, independent timber sales and the long-term sale for the 1985-89 period and in the future.

The Pillars Management Area (S05) is designated as LUD II in the current Tongass Land Management Plan even though it has a road through the northern part and had two MMBF of timber harvested under the 1976-81 ALP Operating Plan (Forest Service 1976). The management direction given in TLMP excludes further timber harvest and road building and empha-

sizes recreational opportunities in the area and the potential enhancement of fish and wildlife resources. Scheduled activities relate only to those emphasized uses.

The Rocky Pass Management Area (S12) is also designated as LUD II. The management direction in TLMP specifies that it be managed for consumptive and nonconsumptive recreation.

The management decisions that are being considered in this SEIS fit within the framework of the management guidelines set forth in the most recent version of the Tongass Land Management Plan. In ANILCA, Congress authorized funding to provide for 4.5 billion board feet of sawlog volume to be made available from the Tongass National forest per decade. According to TLMP data (Forest Service 1986d, pg. 5), the Stikine contribution to meeting ANILCA volume is 109.1 million board feet per year. The Management Areas where timber may be harvested have been established in TLMP. As illustrated in Figure 1-6, TLMP includes 30 percent of the Stikine Area as wilderness or roadless area, and an additional 15 percent is being managed so as not to preclude such designation in the future. Within the Stikine Area, about 43 percent of the LUD III lands and 51 percent of the LUD IV lands are scheduled for timber harvest on a 100- to 120-year timber crop rotation. Analysis Area 12 contains about 9.5 percent of the land area of the Stikine Area, about 17 percent of the LUD IV lands, and over 19 percent of the LUD II lands of the Stikine Area. No LUD I or LUD III lands occur within the Analysis Area. All the proposed timber harvest in Analysis Area 12 would be in LUD IV areas designated by TLMP for intensive management for commodity production.

## Purpose and Need

Federal action is required to provide the volume of timber needed to satisfy contractual obligations with APC until December 31, 1990, and to assure a smooth transition to future timber harvest activities. The range of sawlog volume needed within Analysis Area 12 to meet this obligation was discussed in the Phase I Draft SEIS (Chapter 2, page 32) as 150 to 170 million board feet (MMBF) of timber, 78.3 MMBF of which was available, at the time of the Phase I analysis, from nondeferred VCUs. All of the 78.3 MMBF is expected to be harvested by the end of the 1989 logging season. It is possible that all of the available sawlog volume from the nondeferred VCUs will be harvested by the time this Final Phase II SEIS is completed.

The contents of this Phase II SEIS document respond to the issues identified in the *Tenakee Springs v. Courtright* Memorandum and Order and the Settlement Agreement (Appendix B, Phase I Draft SEIS) and further address the environmental effects associated with meeting contractual obligations of timber volume to APC from Analysis Area 12. The results of the Phase II analysis were presented in the Draft SEISs for review and comment. This Final SEIS responds to public and agency comments. The FEISs for the 1981-86 and 1986-90 Operating Periods and the SEIS documents (Phase I and II Drafts and Final SEIS) serve as a basis for the selection of a preferred alternative and the Regional Forester's Record of Decision.

To formulate a Record of Decision, the Regional Forester must decide:

- whether or not the changes in land ownership, deferrals, deletions, or changes of timber-harvest units, and the effects of ANILCA subsistence legislation warrant modifying the Records of Decision for the 1981-86 or 1986-90 FEISs,
- whether or not the contractual timber commitments between the date of publication of the Draft Supplement and December 31, 1990 (end of the 1986-90 Operating Period) should be met from nondeferred VCUs (398, 399, 400, 402, 421, and parts of 419 and 420) that have some existing access roads and harvest units, and
- if the contractual commitments are not met from these nondeferred VCUs, how much additional timber will be needed and from which VCUs the timber harvest will be scheduled.





Black Bear

## Public Involvement

Issues addressed in this document were identified from the results of the public involvement programs for the 1981-86 and 1986-90 FEISs (Forest Service 1980, 1986b), the issues identified by the Court in *Tenakee Springs v. Courtright* (1987a, b), the issues identified in the Notice of Intent to prepare the Supplemental EISs (Barton 1987), and from comments on the Draft SEIS. Additional scoping of issues was not undertaken prior to beginning the Supplement process; however, the possibility of currently pending national legislation for the Tongass National Forest is addressed.

All comments received during the Supplement process are considered and become part of the record. Review comments have been received on the Phase I Draft SEIS and on the Phase II Draft SEIS. Subsistence hearings provided additional opportunities for public response to subsistence issues related to SEIS alternatives. The Forest Service held subsistence hearings during the comment period on the Draft SEIS in eleven subsistence communities. Comments received in the subsistence hearings are part of the subsistence hearing record (Consolidated Appendix, Volume I, B). Comments received after the hearings relating to subsistence are considered as comments to the Draft SEIS. Such comments are analyzed and evaluated in the Final SEIS along with the other responses to the Draft SEIS (Consolidated Appendix, Volume II, C).

## Issues

The issues that were identified by the Court in *Tenakee Springs v. Courtright* and the issues identified in the Notice of Intent are provided in the Background section above. In addition, some issues addressed in the 1981-86 and 1986-90 FEISs must be evaluated in the Supplement. The following section summarizes the issues carried forward from the 1981-86 and 1986-90 FEISs (including appeals issues), identifies which aspects of the issues will be addressed, and lists the issues outside the scope of the SEIS. The management concerns and management opportunities addressed in the 1986-90 FEIS are addressed within the issues and analysis in this SEIS.



Rowan Bay School, 1988



## Issues Described in the 1981-86 and 1986-90 FEISs

### Issue 1:

**Socioeconomic Effects of Logging and Associated Development.** This issue reflects public concern about effects on community employment, business, and population and on lifestyles and quality of life. Each of these aspects are addressed in this SEIS.

### Issue 2:

**Costs and Benefits.** This issue refers to the trade-offs between environmental protection measures and the economics of the harvest activities. The SEIS alternatives are compared on the basis of factors that affect harvesting and management costs and various benefits.

### Issue 3:

**Effects of Timber Harvesting and Related Activities on Fish Habitat.** The fishing industry is the largest industry in Southeast Alaska. There is high public concern that timber harvesting not be allowed to reduce salmon production. The Forest Service applies extensive and stringent standards and guidelines on roads and timber harvest to prevent such impacts. This issue is addressed in this SEIS and also evaluated as it relates to socioeconomics and subsistence issues.

### Issue 4:

**Effects of Timber Harvest and Related Activities on Wildlife Habitat.** This issue includes concern over several notable wildlife species and the habitats most important to them. Much of the old-growth habitat with perceived high value to wildlife is also high volume timber. This SEIS evaluates the effects on important wildlife and wildlife habitat. This issue is closely related to the subsistence effects issue.

### Issue 5:

**Distribution of Harvest Volume Classes.** This issue spans the concern that harvesting too many high-volume stands will unduly affect fish and wildlife habitat and, alternatively, that high-volume stands are the only stands that can be economically harvested to maintain a viable industry. Both aspects of this issue are addressed in this SEIS.



## Issue 6:

Log Transfer Facility Locations and Environmental Effects. The issue of the placement of log transfer facilities includes concerns about effects on marine organisms, recreation, subsistence, and commercial fisheries. These concerns are addressed in this SEIS.

## Issue 7:

Maintaining Resource Values in High Interest Areas. Certain areas were recognized during the 1986-90 FEIS process as “high-interest” areas because of noted fisheries, wildlife, recreational, wilderness, or other values expressed by agencies, groups, and individuals.

Analysis Area 12 has several high interest areas. The DEIS for the 1986-90 Operating Period addressed how resource values in high interest areas would be maintained. Within Analysis Area 12, VCU 420 (Port Camden) is listed as a high interest area because the Alaska Department of Fish and Game commented in the FEIS about its fisheries and wildlife values; the Southeast Alaska Conservation Council (SEACC) expressed concern for interim protection in VCU 421; other respondents also named VCUs 416, 417, 418, and 419. The issues in 416, 417, 418, and 419 are the same as in the other areas listed.

## Issue 8:

Effects on Visual, Recreational, and Wilderness Resources. This issue concerns a specific desire to maintain the primitive character of many areas in Southeast Alaska because of values other than for timber. Greatest concern is often for areas adjacent to existing designated wilderness (i.e., the Tebenkof Wilderness). This issue is addressed in the evaluation of alternatives in this SEIS.

After the Record of Decision (ROD) for the 1986-90 Operating Period FEIS was signed by the Regional Forester, there were eight separate administrative appeals of the decision. Five of these appeals are awaiting review and decisions by the Chief of the Forest Service. At least one of the appeals states that the Environmental Impact Statement does not comply with the:

- National Environmental Policy Act (NEPA)
- National Forest Management Act (NFMA)
- Alaska National Interest Lands Conservation Act (ANILCA)
- Resources Planning Act (RPA)
- National Historical Preservation Act (NHPA)

Concerns covered such subjects as: subsistence, Native cultural existence, wildlife habitat, wildlife populations, habitat for finfish and shellfish, bald eagle nest trees, feeding and nesting habitat for various species, and harvest of deer and bear. There were concerns expressed that the 1986-90 Planning Process, in a variety of ways, failed to consider reasonable alternatives; failed to assess long-term and cumulative impacts; inadequately discussed environmental impacts; failed to demonstrate effectiveness of and intent to implement mitigation measures; and failed to display adequate site-specific information.

The concerns expressed in the appeals were reviewed and considered by the IDT. A more detailed summary of Statements of Reasons presented in these appeals can be found in Consolidated Appendix, Volume III, G.

## 1986-90 Administrative Appeal Issues

## Issues Outside the Scope of this SEIS

The issues addressed in this SEIS document are those issues identified in the Phase I Draft SEIS. They include the issues required by the Court and issues from the 1981-86 and 1986-90 FEISs that are being reanalyzed.



Issues identified as being outside the scope of the 1986-90 FEIS included:

1. Can the harvest supply target of 4.5 billion board feet of timber per decade for the Tongass National Forest be lowered?
2. Can the Tongass Land Management Program land use designations be changed?
3. Can the APC Contract be cancelled, bought out, or renegotiated?

These issues are also considered outside the scope of this SEIS. For detailed explanations of why these issues are outside the scope of this SEIS, see Consolidated Appendix Volume III, F.

One issue that was considered outside the scope of the 1986-90 FEIS, but is which addressed in the SEIS is the reasonably foreseeable cumulative effects during the life of the APC Long-Term Timber Sale Contract (through the year 2011). The 1986-90 FEIS used a longer planning horizon to predict long-term environmental effects (to 2088). The Supplement evaluates effects to 2011, the end of the APC contract, as being reasonably foreseeable, and tiers to the 1986-90 Plan evaluation for longer term forecasts.

## Permits and Licenses

To proceed with the timber harvest as addressed in the SEIS, permits from other agencies must be obtained. Administrative actions on these permits would take place 30 days after the Final SEIS is filed with the Environmental Protection Agency. The agencies and their responsibilities are listed below.

US Army Corps of Engineers:

- Approval of discharge of dredged or fill materials into the waters of the United States under Section 404 of the Clean Water Act.
- Approval of construction of structures or work in navigable waters of the United States under Section 10 of the Rivers and Harbors Act of 1899.



*Bridge Construction*

## Environmental Protection Agency:

- National Pollutant Discharge Elimination System Review (Section 402 of the Clean Water Act)

## State of Alaska, Department of Natural Resources:

- Tideland Permit and Lease or Easement

## State of Alaska, Department of Environmental Conservation:

- Solid Waste Disposal Permit
- Certification of compliance with Alaska Water Quality Standards (Section 401 of the Clean Water Act)

## United States Coast Guard:

- Coast Guard Bridge Permit (in accordance with the General Bridge Act of 1946) required for all structures constructed within the tidal influence zone

## Major Legislation Relating to the EIS:

- National Environmental Policy Act of 1969 (as amended)
- Forest and Rangeland Renewable Resources Planning Act of 1974
- National Forest Management Act of 1976
- Clean Water Act of 1977

## Coastal Zone Management Act of 1976 (CZMA)

- The Alaska Coastal Management Program (ACMP) developed under CZMA contains the standards and criteria for a determination of consistency for activities within the coastal zone. Although Federal lands are excluded from the Coastal Zone, the Coastal Zone Management Act of 1976 requires Federal agencies conducting activities or undertaking development directly affecting the coastal zone to ensure that the activities or developments are consistent with approved State management programs to the maximum extent practicable. The alternatives have been evaluated by the Forest Service against the applicable provisions (Timber Harvest and Processing, 6 AAC 80.100) of the ACMP and found to be consistent to the maximum extent practicable.



# Chapter 2

## Alternatives Including the Proposed Action







# Chapter 2

## Alternatives Including the Proposed Action

In Chapter 1, the background, issues, concerns, and opportunities associated with the decisions on the Operating Plans for the APC Long-Term Timber Sale Contract for Analysis Area 12 were described. Chapter 2 describes the alternatives that were developed to resolve those issues and concerns and compares the environmental consequences of each alternative. This chapter presents a summary of the conclusions which are reached in Chapter 4 on the basis of detailed analyses also presented in Chapter 4.

The management objectives and criteria used to formulate the alternatives are discussed below. Following that, the alternatives initially considered but eliminated from detailed evaluation are described. Then the alternatives being evaluated in this document are described and compared in terms of their environmental consequences, their effectiveness in meeting the contract needs, and the management opportunities each offers. Chapter 2 concludes with a discussion of applicable standards, guidelines, and mitigation measures.

### Formulation of Alternatives

The National Environmental Policy Act (NEPA) and the Council on Environmental Quality (CEQ) regulations to implement NEPA (40 CFR 1502.14) require that a range of reasonable

*Road Construction*



alternatives, including a no action alternative, be evaluated for projects requiring an EIS. The alternatives were formulated in response to the issues, concerns, and opportunities described in Chapter 1 of this supplement. They tier to the alternatives considered in Chapter 2 of the Phase I Draft SEIS (Forest Service 1988a). Constraints considered during alternative development include (1) the SEIS time frame (until the end of the APC 1986-90 Operating Period), (2) the time needed to obtain permits for and complete construction of log transfer facilities, and (3) the time required to construct roads for access to harvest units in Analysis Area 12 (Consolidated Appendix, Volume III, I). The need to protect resources by dispersing harvest activities geographically as well as through time was also a consideration in the formulation of the alternatives. This meant that some stands of timber that were accessible and available for harvest were not considered for harvest in this SEIS so as to not compound the effects on visual, soil, water, and fishery resources of recent nearby harvests. A total of five alternatives, including the No Action Alternative, were developed and evaluated for Analysis Area 12.

The Interdisciplinary Team used the following management objectives for guidance in responding to the issues described in Chapter 1 to formulate the alternatives. All alternatives were designed in compliance with applicable Forest Service Manual and Handbook direction and would meet Federal, State, and local laws and regulations.

- Implement the Tongass Land Management Plan (TLMP).
- Design Land Management activities to minimize potential for causing landslides.
- Maintain floodplain stability.
- Meet State Water Quality standards especially with reference to sediment.
- Ensure cost effective means of project implementation.
- Plan, develop and operate a network of transportation modes that provide for user safety, convenience, and efficiency to accomplish land and resource management objectives.
- Meet contractual obligations with Alaska Pulp Corporation.
- Protect eagle nesting and roosting habitats.
- Meet or exceed the acres of wildlife habitat projected in TLMP for Analysis Area 12.
- Protect anadromous fish stocks and maintain the productivity of fish habitat.
- Minimize risk of blown down trees.
- Maintain recreational experiences of developed recreation sites.
- Provide for a variety of recreational opportunities commensurate with demand on Kuiu Island without precluding future opportunities.
- Manage scenery using the visual guidelines approved in TLMP.
- Provide for continued subsistence use opportunities.

## Alternatives Considered But Eliminated From Detailed Study

During the development of alternatives, several alternatives were initially considered, but for various reasons, were not fully developed or analyzed and were eliminated from further detailed study.

Alternatives eliminated from detailed study in the Phase I SEIS, including those from the 1981-86 and 1986-90 FEISs, are not repeated in this document. Additional discussion of alternatives eliminated in the Phase I Draft SEIS (Forest Service 1988a) is included in Consolidated Appendix, Volume III, F. It should be noted that a harvest unit can be part of more than one alternative. Therefore, elimination of an alternative does not necessarily eliminate the individual harvest unit from further consideration. Listed below are the alternatives eliminated from further consideration along with an explanation of why they were eliminated.





*A-Frame Log Truck Unloading System, Kuiu Island*

- A. No development activities were considered in VCUs 403, 427, and 428 since these are classified as Land Use Designation (LUD) II. The Tongass Land Management Plan did not schedule timber harvest in these lands. VCU 405.1 is designated as a LUD I Release Area where road construction could occur, but timber harvest units would not be scheduled.
- B. The Preferred Alternative identified in the 1981-86 Final EIS Record Of Decision would have required about 56.8 miles of specified road construction to access 88 MMBF in 43 cutting units (Forest Service 1980a, p.46). Because it would not be feasible to build the remaining required roads within the SEIS time frame, this alternative was not considered further.
- C. Phase I of the Draft SEIS stated in Chapter 2 (Forest Service 1988a, p.34) that the 1986-90 Alternatives A through J would have low priority for consideration in the Phase II SEIS. The rationale is that none of the previous alternatives, including the Record Of Decision, could be implemented within the SEIS time frame due to logistical and time constraints on road construction and harvest operations. Alternatives A through J will not be evaluated in this SEIS.
- D. An alternative that would have included construction of a log transfer facility and specified roads to access harvest units on the eastern half of Port Camden (VCU 420) was considered but eliminated. The reason for deferring consideration of this alternative included management concerns that the necessary permits could not be obtained within the SEIS time frame to allow construction of the log transfer facility and tributary roads to access proposed cutting units. Subsequent planning efforts may reconsider these development activities in East Port Camden.
- E. Development activities in VCU 416 (Alvin Bay) were considered but deferred for future planning. Entry into this VCU would require completion of road construction through VCU 417 (No Name Bay) to access potential cutting units. Timber volume requirements could be met without entry into VCU 416 during the SEIS time frame.
- F. Development activities were considered in VCU 401 (Washington Bay), but were deferred for future planning. Entry into this VCU would require construction of one to three new log transfer facilities, A-frame harvest systems, and a road through VCU 400 on the western half of Security Bay. These activities could not be completed within the SEIS time frame, but may be considered in future planning. Developments in this VCU were not evaluated during the 1981-86 or 1986-90 Operating Periods.
- G. Development activities in VCU 398 (Keku Strait) were deferred for future planning since timber volume needed on Kuiu Island could be met in other VCUs being evaluated. Sealaska Corporation has tentatively selected lands in this VCU, but the conveyance process has not been completed. Activities in this VCU were not planned during the 1981-86 or 1986-90 Operating Periods.

## Alternatives Evaluated in this EIS

### Alternative 1: No Action - Current Direction and No Further Harvest

Alternative 1 is the No Action Alternative required by NEPA. It assumes no change in the current direction. For Kuiu Island, this alternative would permit the activities currently authorized by the Court to continue. The only mechanism available to implement this alternative is the Record of Decision (ROD) associated with this SEIS. If the Regional Forester decides to implement this alternative, only those activities presently authorized in nondeferred VCUs would be allowed to be completed. That ROD will not be available until about the end of the 1989 harvest season. By that time, all or nearly all road construction and harvest activities in nondeferred VCUs are expected to be completed.

## 2 Alternatives

A No Further Harvest alternative, which would stop all presently scheduled road construction and timber harvest and which would propose no additional harvest activities through the balance of the 1986-90 Operating Period is also evaluated. In Analysis Area 12, the No Further Harvest alternative would have the same effect as the Current Direction and, therefore, they are jointly presented as Alternative 1 in this Draft. A No Further Harvest Alternative has the same effect as the No Action Alternative because all activities presently authorized in nondeferred VCUs are expected to be completed at the time the Record of Decision for this Supplement is issued. Alternative 1 is evaluated as a basis for comparing the action alternatives with respect to the environmental consequences, the effectiveness in meeting Contract requirements, and the management objectives.

The objectives and guidelines (Forest Service 1983) in effect for the 1986-90 Operating Period EIS would apply to those activities continuing under Court authorization. If implemented, Alternative 1 would:

- cease timber harvesting and road construction on Kuiu Island when activities currently authorized by the Settlement Agreement are completed, probably sometime during the 1989 operating season.
- use the existing log transfer facilities and logging camp at Rowan Bay until activities ceased.
- have high probability of causing the Forest Service as representatives of the United States Government to breach APC contractual obligations because of inability to substitute volume in other parts of the APC Contract area within the Supplement time frame.
- stop future timber harvesting and road building activities until another Environmental Impact Statement and Record of Decision approved continuance of activities.

Alternative 1 does not propose harvest units or road construction beyond the activities approved in the settlement agreement. Therefore, the tables and figures presented in Chapter 3 describe the conditions of Alternative 1. The existing roads and harvest units, including those activities continuing under Court authorization, are shown on the Alternative 1 map, folded into the back of this document.

*Wrangell Mill*





## Alternative 2: West Security Bay

Alternative 2 proposes to initiate intensive timber management and road construction along the western half of Security Bay (VCU 400) and on the western half of Port Camden (VCU 420). It would also include additional timber harvesting activities at Saginaw Bay (VCU 399), Rowan Bay (VCU 402), and at Kadake Bay (VCU 421). The main intent of this alternative is to meet Forest Service contractual obligations in VCUs other than those deferred or partially deferred such as Alvin Bay (VCU 416), No Name Bay (VCU 417), Seclusion Harbor (VCU 418), Threemile Arm (VCU 419), and the eastern half of Port Camden (VCU 420).

The general management objectives used to develop this and other alternatives are listed in the Formulation of Alternatives section. If Alternative 2 were implemented, it would:

- harvest 87.4 MMBF, which is in the mid range needed to meet the sawlog volume projected in Phase I of the SEIS.
- use the existing log transfer facilities and logging camp at Rowan Bay.
- initiate harvest in the western half of Security Bay (VCU 400).
- initiate harvest in the western half of Port Camden (VCU 420).
- construct a moderate amount (27.2 miles) of system roads.

Table 2-1 presents the acres and volume of timber harvest proposed in Alternative 2. The proposed and existing harvest units and roads for Alternative 2 are displayed on the Alternative 2 map, folded into the back of this document.

Table 2-1

### Proposed Timber Harvest by VCU, Harvest Unit, and Volume Class for Alternative 2

VCU	Harvest Unit	Volume (MBF)	Volume Class (acres) <sup>1</sup>				Total Acres	Volume/Acre
			4	5	6	7		
399	7	1,955	25	65	0	0	90	21.7
	8	1,558	16	54	0	0	70	22.3
	9	1,736	0	70	0	0	70	24.8
	12	2,108	0	85	0	0	85	24.8
	VCU Total	7,357	41	274	0	0	315	23.4
400	2	496	0	20	0	0	20	24.8
	4	800	0	0	20	0	20	40.0
	5	960	0	0	24	0	24	40.0
	6	1,976	7	0	47	0	54	36.6
	7	2,232	0	90	0	0	90	24.8
	8	298	0	12	0	0	12	24.8
	14	1,167	18	0	23	0	41	28.5
	15	3,200	0	0	80	0	80	40.0
	18	2,480	0	100	0	0	100	24.8
	19	2,024	12	75	0	0	87	23.3
	21	1,463	0	59	0	0	59	24.8
	24	1,447	35	39	0	0	74	19.6
	VCU Total	18,542	72	395	194	0	661	28.1

(Continued)

## 2 Alternatives

Table 2-1 (Continued)

### Proposed Timber Harvest by VCU, Harvest Unit, and Volume Class for Alternative 2

VCU	Harvest Unit	Volume (MBF)	Volume Class (acres) <sup>1</sup>				Total Acres	Volume/Acre
			4	5	6	7		
402	2	2,120	0	0	53	0	53	40.0
	3	977	0	0	17	5	22	44.4
	4	2,240	0	0	56	0	56	40.0
	10	2,200	0	0	55	0	55	40.0
	11	3,640	0	0	91	0	91	40.0
	14	520	0	0	13	0	13	40.0
	VCU Total	11,697	0	0	285	5	290	40.3
420	2	2,592	52	0	47	0	99	26.2
	3	1,640	0	0	41	0	41	40.0
	4	4,044	12	0	97	0	109	37.1
	6	2,880	0	0	72	0	72	40.0
	7	2,320	0	0	58	0	58	40.0
	8	2,840	0	0	71	0	71	40.0
	10	1,227	37	0	18	0	55	22.3
	11	1,640	0	0	41	0	41	40.0
	12	2,160	0	0	54	0	54	40.0
	13	4,320	0	0	108	0	108	40.0
	14	372	0	15	0	0	15	24.8
	VCU Total	26,036	101	15	607	0	723	36.1
421	12	3,006	15	0	70	0	85	35.4
	13	1,200	0	0	30	0	30	40.0
	14	2,840	0	0	71	0	71	40.0
	15	890	0	0	0	15	15	59.3
	16	440	0	0	11	0	11	40.0
	17	620	0	25	0	0	25	24.8
	18	1,530	0	23	24	0	47	32.6
	19	4,023	0	9	95	0	104	38.7
	31	4,182	0	17	94	0	111	37.7
	36	5,059	0	5	27	65	97	52.1
	VCU Total	23,789	15	79	422	80	596	39.9
Total for All VCUs		87,420	229	763	1,508	85	2,585	33.8

SOURCE: Multi-Entry Layout Process database, Stikine Area Supervisor's Office, Petersburg, AK.

<sup>1</sup> Volume Classes 1 through 3 (not presented) contain less than 8 MBF/acre; Volume Class 4 contains 8-20 MBF/acre; Volume Class 5 contains 20-30 MBF/acre; Volume Class 6 contains 30-50 MBF/acre; and Volume Class 7 contains 50 or more MBF/acre.

## Alternative 3: No Name Bay

Alternative 3 proposes to initiate intensive timber management and road construction activities in No Name Bay (VCU 417) and Seclusion Harbor (VCU 418), as well as on the western half of Port Camden (VCU 420) and within the Kadake Creek drainage (VCU 421). It would also include additional timber harvesting activities in Saginaw Bay (VCU 399), the eastern half of Security Bay (VCU 400), and Rowan Bay (VCU 402). The primary objectives of this alternative are to expand the transportation system into as many new locations as feasible to facilitate future timber harvest in Analysis Area 12 and to develop a log transfer facility at No Name Bay, connecting it to the existing road system. These objectives are consistent with the intent of both the 1981-86 and 1986-90 RODs.

The general management objectives used to develop this and other alternatives are listed in the Formulation of Alternatives section. If Alternative 3 were implemented, it would:

- harvest 124.8 MMBF, which exceeds the high end of the volume need projected in the Phase I SEIS. This volume of timber would ensure sufficient operable volume for the company to schedule operations until a subsequent EIS could be completed.
- construct the most miles (37.3) of new road.
- initiate harvest activities in the deferred areas of No Name Bay and Seclusion Harbor (VCUs 417 and 418).
- initiate harvest activities in the western half of Port Camden (VCU 420) and along the east side of the Kadake Creek drainage (VCU 421).
- construct a new log transfer facility and camp at No Name Bay.
- connect No Name Bay and Rowan Bay LTFs by road.

Table 2-2 presents the acres and volume of timber harvest proposed in Alternative 3. The proposed and existing harvest units, roads, and log transfer facilities are illustrated on the Alternative 3 map folded into the back of this document. This alternative includes proposed

*No Name Bay*



## 2 Alternatives

Table 2-2

### Proposed Timber Harvest by VCU, Harvest Unit, and Volume Class for Alternative 3

VCU	Harvest Unit	Volume (MBF)	Volume Class (acres) <sup>1</sup>				Total Acres	Volume/Acre
			4	5	6	7		
399	7	1,955	25	65	0	0	90	21.7
	8	1,558	16	54	0	0	70	22.3
	9	1,736	0	70	0	0	70	24.8
	12	2,108	0	85	0	0	85	24.8
	VCU Total	7,357	41	274	0	0	315	23.4
400	2	496	0	20	0	0	20	24.8
	4	800	0	0	20	0	20	40.0
	5	960	0	0	24	0	24	40.0
	6	1,976	7	0	47	0	54	36.6
	7	2,232	0	90	0	0	90	24.8
	VCU Total	6,464	7	110	91	0	208	31.1
402	2	2,120	0	0	53	0	53	40.0
	3	977	0	0	17	5	22	44.4
	4	2,240	0	0	56	0	56	40.0
	10	2,200	0	0	55	0	55	40.0
	11	3,640	0	0	91	0	91	40.0
	14	520	0	0	13	0	13	40.0
	VCU Total	11,697	0	0	285	5	290	40.3
417 <sup>2</sup>	8	2,699	0	0	0	45	45	59.3
	10	137	10	0	0	0	10	13.7
	12	543	5	0	0	8	13	41.8
	13	3,262	0	0	0	55	55	59.3
	14	5,681	0	0	16	85	101	56.2
	15	3,024	0	0	0	51	51	59.3
	16	4,744	0	0	0	80	80	59.3
	20	4,032	0	0	0	68	68	59.3
	21	818	0	33	0	0	33	24.8
	VCU Total	24,909	15	33	16	392	456	54.6
418 <sup>2</sup>	1	1,008	0	0	0	17	17	59.3
	2	5,515	0	0	0	93	93	59.3
	4	3,499	0	0	0	59	59	59.3
	5	1,067	0	0	0	18	18	59.3
	6	1,127	0	0	0	19	19	59.3
	VCU Total	12,216	0	0	0	206	206	59.3

(Continued)



Table 2-2 (Continued)

**Proposed Timber Harvest by VCU, Harvest Unit, and Volume Class for Alternative 3**

VCU	Harvest Unit	Volume (MBF)	Volume Class (acres) <sup>1</sup>				Total Acres	Volume/Acre
			4	5	6	7		
420	2	2,592	52	0	47	0	99	26.2
	3	1,640	0	0	41	0	41	40.0
	4	4,044	12	0	97	0	109	37.1
	6	2,880	0	0	72	0	72	40.0
	7	2,320	0	0	58	0	58	40.0
	8	2,840	0	0	71	0	71	40.0
	10	1,227	37	0	18	0	55	22.3
	11	1,640	0	0	41	0	41	40.0
	12	2,160	0	0	54	0	54	40.0
	13	4,320	0	0	108	0	108	40.0
	14	372	0	15	0	0	15	24.8
VCU Total		26,036	101	15	607	0	723	36.1
421	6	4,640	0	0	116	0	116	40.0
	7	3,480	0	0	87	0	87	40.0
	9	521	0	21	0	0	21	24.8
	11	3,680	0	0	92	0	92	40.0
	12	3,006	15	0	70	0	85	35.4
	13	1,200	0	0	30	0	30	40.0
	14	2,840	0	0	71	0	71	40.0
	15	890	0	0	0	15	15	59.3
	16	440	0	0	11	0	11	40.0
	17	620	0	25	0	0	25	24.8
	18	1,530	0	23	24	0	47	32.6
	19	4,023	0	9	95	0	104	38.7
	31	4,182	0	17	94	0	111	37.7
	36	5,059	0	5	27	65	97	52.1
VCU Total		36,110	15	100	717	80	912	39.6
Total for All VCUs		124,788	179	532	1,716	683	3,110	40.1

SOURCE: Multi-Entry Layout Process database, Stikine Area Supervisor's Office, Petersburg, AK.

<sup>1</sup> Volume Classes 1 through 3 (not presented) contain less than 8 MBF/acre; Volume Class 4 contains 8-20 MBF/acre; Volume Class 5 contains 20-30 MBF/acre; Volume Class 6 contains 30-50 MBF/acre; and Volume Class 7 contains 50 or more MBF/acre.

<sup>2</sup> These VCUs are being considered for Wilderness designation in H.R. 987.

## 2 Alternatives

harvest activities in VCUs 417 and 418. Both of these VCUs are currently being considered for Wilderness designation under H. R. 987 (The Tongass Reform Act). Passage of this legislation would reduce the volume available for harvest in this alternative by 37.1 MMBF to a total of 88.1 MMBF.

### Alternative 4: North Kuiu

Alternative 4 would concentrate timber harvesting activities in areas of North Kuiu where such activities have previously occurred in Saginaw Bay (VCU 399), the eastern half of Security Bay (VCU 400), and Rowan Bay (VCU 402), while initiating management efforts in west Port Camden (VCU 420) and along the eastern side of the Kadake Creek drainage (VCU 421). The primary intent of this alternative is to minimize new road construction, while maximizing timber harvest along the existing road system. This is proposed in lieu of entering deferred or partially deferred VCUs such as Alvin Bay (VCU 416), No Name Bay (VCU 417), Seclusion Harbor (VCU 418), Threemile Arm (VCU 419), and the eastern half of Port Camden (VCU 420).

The general management objectives in the Formulation of Alternatives section would apply. If implemented, Alternative 4 would:

- harvest 93.8 MMBF, which falls in the high end of the range projected in the Phase I SEIS.
- initiate harvest activities in the western half of Port Camden (VCU 420) and along the east side of the Kadake Creek drainage (VCU 421).
- use the existing log transfer facilities and camp at Rowan Bay.

*North Kuiu*



Table 2-3

## Proposed Timber Harvest by VCU, Harvest Unit, and Volume Class for Alternative 4

VCU	Harvest Unit	Volume (MBF)	Volume Class (acres) <sup>1</sup>				Total Acres	Volume/Acre
			4	5	6	7		
399	7	1,955	25	65	0	0	90	21.7
	8	1,558	16	54	0	0	70	22.3
	9	1,736	0	70	0	0	70	24.8
	10	1,292	5	9	25	0	39	33.1
	11	2,570	0	52	32	0	84	30.6
	12	2,108	0	85	0	0	85	24.8
	VCU Total	11,218	46	335	57	0	438	25.6
400	2	496	0	20	0	0	20	24.8
	4	800	0	0	20	0	20	40.0
	5	960	0	0	24	0	24	40.0
	6	1,976	7	0	47	0	54	36.6
	7	2,232	0	90	0	0	90	24.8
	VCU Total	6,464	7	110	91	0	208	31.1
402	2	2,120	0	0	53	0	53	40.0
	3	977	0	0	17	5	22	44.4
	4	2,240	0	0	56	0	56	40.0
	9	2,240	0	50	35	0	75	29.9
	10	2,200	0	0	55	0	55	40.0
	11	3,640	0	0	91	0	91	40.0
	14	520	0	0	13	0	13	40.0
	VCU Total	13,937	0	50	310	5	365	38.2
420	2	2,592	52	0	47	0	99	26.2
	3	1,640	0	0	41	0	41	40.0
	4	4,044	12	0	97	0	109	37.1
	6	2,880	0	0	72	0	72	40.0
	7	2,320	0	0	58	0	58	40.0
	8	2,840	0	0	71	0	71	40.0
	10	1,227	37	0	18	0	55	22.3
	11	1,640	0	0	41	0	41	40.0
	12	2,160	0	0	54	0	54	40.0
	13	4,320	0	0	108	0	108	40.0
	14	372	0	15	0	0	15	24.8
	VCU Total	26,036	101	15	607	0	723	36.1

(Continued)



## 2 Alternatives

Table 2-3 (Continued)

### Proposed Timber Harvest by VCU, Harvest Unit, and Volume Class for Alternative 4

VCU	Harvest Unit	Volume (MBF)	Volume Class (acres) <sup>1</sup>				Total Acres	Volume/Acre
			4	5	6	7		
421	6	4,640	0	0	116	0	116	40.0
	7	3,480	0	0	87	0	87	40.0
	9	521	0	21	0	0	21	24.8
	11	3,680	0	0	92	0	92	40.0
	12	3,006	15	0	70	0	85	35.4
	13	1,200	0	0	30	0	30	40.0
	14	2,840	0	0	71	0	71	40.0
	15	890	0	0	0	15	15	59.3
	16	440	0	0	11	0	11	40.0
	17	620	0	25	0	0	25	24.8
	18	1,530	0	23	24	0	47	32.6
	19	4,023	0	9	95	0	104	38.7
	31	4,182	0	17	94	0	111	37.7
	36	5,059	0	5	27	65	97	52.1
	VCU Total	36,110	15	100	717	80	912	39.6
Total for All VCUs		93,764	169	610	1,782	85	2,646	35.5

SOURCE: Multi-Entry Layout Process database, Stikine Area Supervisor's Office, Petersburg, AK.

<sup>1</sup> Volume Classes 1 through 3 (not presented) contain less than 8 MBF/acre; Volume Class 4 contains 8-20 MBF/acre; Volume Class 5 contains 20-30 MBF/acre; Volume Class 6 contains 30-50 MBF/acre; and Volume Class 7 contains 50 or more MBF/acre.

## Alternative 5: Threemile Arm

- construct the fewest miles (23.4) of system road.

Table 2-3 presents the proposed acres and volume of timber harvest in Alternative 4. The existing and proposed roads and harvest units are illustrated on the Alternative 4 map folded into the back of this document.

Alternative 5 is the same as Alternative 4, except for the extension of the road system and timber management along the north shore of Threemile Arm (VCU 419).

The general management objectives used to develop this and other alternatives are listed in the Formulation of Alternatives section. If implemented, Alternative 5 would:

- harvest 105.3 MMBF, which exceeds the upper end of the range of volume need projected in the Phase I SEIS. This volume of timber would ensure sufficient operable volume for the company to be able to schedule operations until a subsequent EIS effort could be completed.
- emphasize harvest activities along the northern shore of Threemile Arm (VCU 419).
- initiate harvest activities in the western half of Port Camden (VCU 420) and within the Kadake Creek drainage (VCU 421).
- use the existing log transfer facilities and camp at Rowan Bay.
- construct an intermediate amount of system road (29.6 miles).

Table 2-4 presents the proposed acres and volume of timber harvest in Alternative 5. The existing and proposed roads and the proposed harvest units are illustrated on the Alternative 5 map folded into the back of this document.

*Threemile Arm*



# 2 Alternatives

Table 2-4  
Proposed Timber Harvest by VCU, Harvest Unit, and Volume Class for Alternative 5

VCU	Harvest Unit	Volume (MBF)	Volume Class (acres) <sup>1</sup>				Total Acres	Volume/ Acre
			4	5	6	7		
399	7	1,955	25	65	0	0	90	21.7
	8	1,558	16	54	0	0	70	22.3
	9	1,736	0	70	0	0	70	24.8
	10	1,292	5	9	25	0	39	33.1
	11	2,570	0	52	32	0	84	30.6
	12	2,108	0	85	0	0	85	24.8
	VCU Total	11,218	46	335	57	0	438	25.6
400	2	496	0	20	0	0	20	24.8
	4	800	0	0	20	0	20	40.0
	5	960	0	0	24	0	24	40.0
	6	1,976	7	0	47	0	54	36.6
	7	2,232	0	90	0	0	90	24.8
	VCU Total	6,464	7	110	91	0	208	31.1
402	2	2,120	0	0	53	0	53	40.0
	3	977	0	0	17	5	22	44.4
	4	2,240	0	0	56	0	56	40.0
	9	2,240	0	50	25	0	75	29.9
	10	2,200	0	0	55	0	55	40.0
	11	3,640	0	0	91	0	91	40.0
	14	520	0	0	13	0	13	40.0
	VCU Total	13,937	0	50	310	5	365	38.2
419	12	1,280	0	0	32	0	32	40.0
	13	1,120	0	0	28	0	28	40.0
	14	223	0	9	0	0	9	24.8
	15	521	0	21	0	0	21	24.8
	16	560	0	0	14	0	14	40.0
	17	521	0	21	0	0	21	24.8
	18	471	0	19	0	0	19	24.8
	19	620	0	25	0	0	25	24.8
	20	298	0	12	0	0	12	24.8
	21	3,652	0	0	32	40	72	50.7
	22	2,240	0	0	56	0	56	40.0
	VCU Total	11,506	0	107	162	40	309	37.2

(Continued)



Table 2-4 (continued)

## Proposed Timber Harvest by VCU, Harvest Unit, and Volume Class for Alternative 5

VCU	Harvest Unit	Volume (MBF)	Volume Class (acres) <sup>1</sup>				Total Acres	Volume/Acre
			4	5	6	7		
420	2	2,592	52	0	47	0	99	26.2
	3	1,640	0	0	41	0	41	40.0
	4	4,044	12	0	97	0	109	37.1
	6	2,880	0	0	72	0	72	40.0
	7	2,320	0	0	58	0	58	40.0
	8	2,840	0	0	71	0	71	40.0
	10	1,227	37	0	18	0	55	22.3
	11	1,640	0	0	41	0	41	40.0
	12	2,160	0	0	54	0	54	40.0
	13	4,320	0	0	108	0	108	40.0
	14	372	0	15	0	0	15	24.8
VCU Total		26,036	101	15	607	0	723	36.1
421	6	4,640	0	0	116	0	116	40.0
	7	3,480	0	0	87	0	87	40.0
	9	521	0	21	0	0	21	24.8
	11	3,680	0	0	92	0	92	40.0
	12	3,006	15	0	70	0	85	35.4
	13	1,200	0	0	30	0	30	40.0
	14	2,840	0	0	71	0	71	40.0
	15	890	0	0	0	15	15	59.3
	16	440	0	0	11	0	11	40.0
	17	620	0	25	0	0	25	24.8
	18	1,530	0	23	24	0	47	32.6
	19	4,023	0	9	95	0	104	38.7
	31	4,182	0	17	94	0	111	37.7
	36	5,059	0	5	27	65	97	52.1
VCU Total		36,110	15	100	717	80	912	39.6
Total for all VCUs		105,269	169	717	1,944	125	2,955	35.6

SOURCE: Multi-Entry Layout Process database, Stikine Area Supervisor's Office, Petersburg, AK.

<sup>1</sup> Volume Classes 1 through 3 (not presented) contain less than 8 MBF/acre; Volume Class 4 contains 8-20 MBF/acre; Volume Class 5 contains 20-30 MBF/acre; Volume Class 6 contains 30-50 MBF/acre; and Volume Class 7 contains 50 or more MBF/acre.

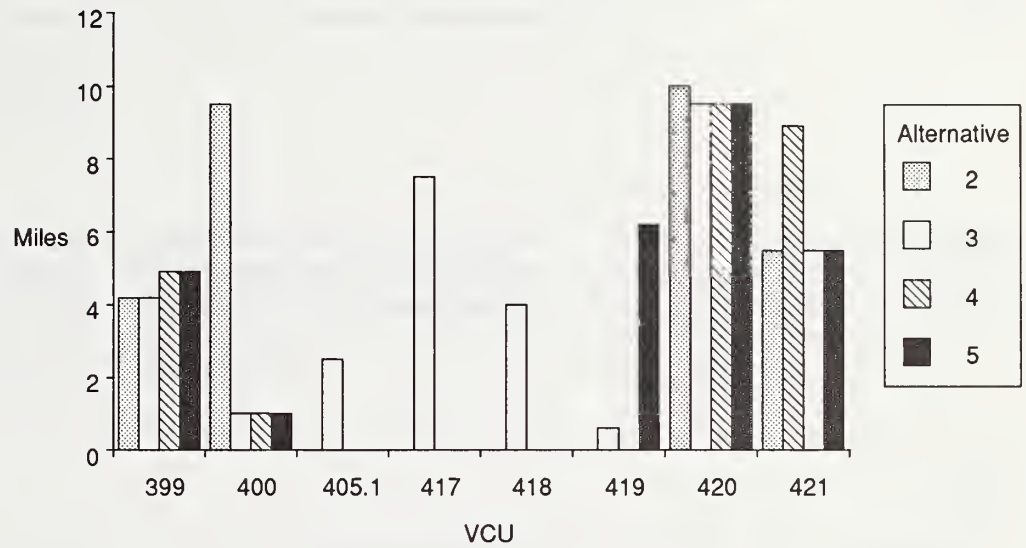
## Comparison of the Alternatives

The comparison of alternatives draws together the conclusions from the materials presented throughout the document and provides the results of the analysis. It also presents the rationale leading to the identification of a preferred alternative. The following sections compare the environmental impacts of the alternatives on the basis of the detailed analyses given in Chapter 4. The discussion next focuses on the issues, presenting a perspective on their perceived importance; it also compares the alternatives on the basis of management opportunities where they may differ in some enhancement of present or future amenities, resource production capabilities, or usability of resources. The discussion continues by comparing the economic aspects of the alternatives including both their direct and indirect costs and benefits. The discussion ends by comparing effectiveness of the alternatives in meeting the management direction of the Tongass Land Management Plan and the contract requirements of the APC Long-Term Timber Sale Contract.

### Impact Comparison

Table 2-5, Summary Comparison of Alternatives, provides a summary comparison of the impacts anticipated from each of the alternatives. This table summarizes more detailed information found in Chapter 4, Environmental Consequences. Figure 2-1 shows a comparison of road construction for all alternatives. The first part of Chapter 2 above presents a description of each alternative, while the analyses in Chapter 4 provide more detailed information on the impacts of the alternatives.

Figure 2-1  
Road Construction Required for Each Alternative in Each VCU<sup>1</sup>



SOURCE: SEIS Planning Record.

<sup>1</sup> All currently authorized road construction is anticipated to be completed prior to the ROD, therefore no road construction is shown for Alternative 1.



## 2 Alternatives

Table 2-5  
Summary Comparison of Alternatives<sup>1</sup>

	Alternative 1 No Action/Current Direction	Alternative 2 West Security Bay
Soils	No additional impacts.	No units or roads would be located on high hazard soils. This would greatly reduce the potential to adversely impact soil productivity, mass wasting, and soil loss.
Vegetation	Tree species composition and density would not change. No planting or pre-commercial thinning would be needed.	Tree and understory species composition would be slightly altered on 2,595 acres. Precommercial thinning would be scheduled to accelerate both understory and conifer growth rates.
Wildlife		
<i>Beach Fringe</i>	No additional impacts.	Parts of a road would be located in beach fringe affecting 6 acres.
<i>Estuarine Fringe</i>	No additional impacts	Road would be located within estuarine fringe at the head of Security Bay affecting 18 acres.
<i>Eagle Sites</i>	No known eagle nest sites would be impacted.	No known eagle nest sites would be impacted.
<i>Deer Winter Range</i>	Deer winter range would not be impacted.	Greatest impact on deer winter range (DWR). Approximately 573 acres or 0.7 percent of existing DWR impacted. This is within TLMP Guidelines of 4 percent LUD III and 5 percent LUD IV.
<i>Inland Wetlands</i>	Inland wetlands would not be impacted.	Inland wetlands would not be impacted.
<i>Streamside/Riparian</i>	Streamside/Riparian habitat would not be impacted.	Total of 8 acres or 0.5 percent of Streamside/Riparian acres in road right-of-way. TLMP calls for 20 percent in LUD III or 10 percent in LUD IV to be retained. Impacts are within TLMP Guidelines.

(Table Continued)

## Alternative 3 No Name Bay

## Alternative 4 North Kuia

## Alternative 5 Threemile Arm

Impacts would be the same for all action alternatives.

Tree and understory species composition would be slightly altered on 3,120 acres. Precommercial thinning would be scheduled to accelerate both understory and conifer growth rates.

Tree and understory species composition would be slightly altered on 2,656 acres. Precommercial thinning would be scheduled to accelerate both understory and conifer growth rates.

Tree and understory species composition would be slightly altered on 2,965 acres. Precommercial thinning would be scheduled to accelerate both understory and conifer growth rates.

No additional impacts.

No additional impacts.

No known eagle nest sites would be impacted by any of the alternatives.

Second highest impact on DWR. Approximately 408 acres or 0.5 percent of existing DWR impacted. This is within TLMP Guidelines.

Least impact on DWR. Approximately 307 acres or 0.4 percent of existing DWR impacted. This is within TLMP Guidelines.

Least impact on DWR. Approximately 307 acres or 0.4 percent of existing DWR impacted. This is within TLMP Guidelines.

Total of 204 acres or 1.3 percent of inland wetlands impacted. This is within TLMP guidelines of 85 percent in LUD III and 25 percent in LUD IV to be retained.

Total of 40 acres or 0.3 percent of inland wetlands impacted. This is within TLMP guidelines.

Total of 64 acres or 0.4 percent of inland wetlands impacted. This is within TLMP guidelines.

Total of 8 acres or 0.5 percent of Streamside/Riparian acres in road right-of-way. Impacts are within TLMP Guidelines.

Total of 8 acres or 0.5 percent of Streamside/Riparian acres in road right-of-way. Impacts are within TLMP Guidelines.

Total of 16 acres or 0.9 percent of Streamside/Riparian acres in road right-of-way. Impacts are within TLMP Guidelines.

(Table Continued)

## 2 Alternatives

Table 2-5 (Continued)

### Summary Comparison of Alternatives<sup>1</sup>

	Alternative 1 No Action/Current Direction	Alternative 2 West Security Bay
Fish Habitat		
<i>Aquatic Habitat Management Units</i>	No additional impacts.	AHMU buffers of 100 feet will be maintained on Class I and Class II streams, except one unit each in VCUs 417 and 419, which have 50 foot buffers.
<i>Roads and Crossings</i>	No additional impacts.	No roads would require AHMU protection measures. One Class I stream crossing would require benefit/cost analysis.
<i>Stream Flow</i>	No change	Little potential for change in stream flows.
<i>Sediment</i>	No change	Application of standards and guidelines is expected to minimize impacts to soils.
Marine Environment	No change	No change
Land Status	No change	No change
Recreation	Would maintain the existing recreational character of Kuiu Island.	Logging west of Security Bay would represent the largest change in recreation opportunities within a dispersed use site.
Visual	Visual character would not be affected.	Five VCUs would be entered and three meet assigned VQOs. Security Bay would appear in a modified condition. Assigned VQOs would be met in other VCUs.

(Table Continued)



## Alternative 3 No Name Bay

## Alternative 4 North Kuiu

## Alternative 5 Threemile Arm

AHMU buffers of 100 feet will be maintained on Class I and Class II streams, except one unit each in VCUs 417 and 419, which have 50 foot buffers.

One mile of road would require AHMU protection measures. Four Class I stream crossings would require benefit/cost analysis.

No roads would require AHMU protection measures. Two Class I stream crossings would require benefit/cost analysis.

0.3 mile of road would require AHMU protection measures. Two Class I stream crossings would require benefit/cost analysis.

Little potential for change in streamflow.

Application of standards and guidelines is expected to minimize impacts to soils.

Low-angle slide LTF at No Name Bay. Low potential for impacting marine fisheries outside the sill. Little impact on salmon or herring or crab. It is estimated that 3.3 acres of 19,800 acres of habitat will be impacted by the LTF. This is equal to 0.02 percent.

No change

No change

No change

No change

No change

East Kuiu would shift from primitive opportunities to roaded setting. LTF would directly affect boat anchorage at No Name Bay. Harvest proposed along Kadake Creek would affect recreation users.

Least impact on recreation except for Alternative 1. Harvest proposed along Kadake Creek would affect recreation users.

Generally, same impacts as in Alternative 4 plus the extension of road around Threemile Arm.

Eight VCUs entered and five meet assigned VQOs. No Name Bay area would be visibly altered as would areas seen inland from Kadake Creek.

Five VCUs entered and four meet assigned VQOs. This alternative causes least impact to visual character of North Kuiu. Impacts to Kadake Creek are the same as Alternative 3.

Six VCUs entered and four meet assigned VQOs. Impacts are the same as in Alternative 4. Visual character of northeast Threemile Arm would be visibly altered by two harvest units.

(Table Continued)

## 2 Alternatives

Table 2-5 (Continued)

### Summary Comparison of Alternatives<sup>1</sup>

	Alternative 1 No Action/Current Direction	Alternative 2 West Security Bay
Cultural Resources	No impact	Estimate six harvest units, or 247 acres, and approximately 10 miles of road will require more detailed field examination prior to development.
Socioeconomics	Impacts would include loss of 417 existing jobs and \$9.6 million in salaries for the timber industry, closure of Rowan Bay logging camp, and a potential loss of 80 jobs at the Wrangell mill.	Harvest volume would provide for 747 jobs and \$17.3 million in salaries inclusive of direct, indirect, and induced employment effects.
Subsistence	Insignificant possibility of a significant restriction of subsistence use.	Insignificant possibility of a significant restriction of subsistence use.
Timber/Firewood	Free use policies not affected.	Free use policies not affected.
Reasonably Foreseeable, Long-Term, and Cumulative Effects	Minimal effects on all resources evaluated.	Minimal effects on all resources evaluated.

Alternative 3 No Name Bay	Alternative 4 North Kuiu	Alternative 5 Threemile Arm
Estimate three harvest units, or 130 acres, and 3 miles of specified road construction will require more detailed field examination prior to development.	Estimate three harvest units, or 130 acres, and 3 miles of specified road construction will require more detailed field examination prior to development.	Estimate four harvest units, or 150 acres, and approximately 4 miles of specified road will require more detailed field examination prior to development.
Harvest volume would provide for 1,061 jobs and \$24.6 million in salaries inclusive of direct, indirect, and induced employment effects.	Harvest volume would provide for 797 jobs and \$18.5 million in salaries inclusive of direct, indirect, and induced employment effects.	Harvest volume would provide for 895 jobs and \$20.8 million in salaries inclusive of direct, indirect, and induced employment effects.
Insignificant possibility of a significant restriction of subsistence use.	Insignificant possibility of a significant restriction of subsistence use.	Insignificant possibility of a significant restriction of subsistence use.
Free use policies not affected.	Free use policies not affected.	Free use policies not affected.
Minimal effects from all alternatives on all resources evaluated.		

<sup>1</sup> A detailed comparison of impacts is found in Chapter 4.



# 2 Alternatives

*Making a Log Raft in Rowan Bay*



## Issue Comparison

Chapter 1 lists the issues that are the focus of the Phase I and Phase II SEISs, as well as management opportunities and concerns. The following paragraphs compare the alternatives in terms of these issues and the management opportunities and concerns.

### **Issue 1: Socioeconomic effects of timber harvesting and associated development.**

The baseline for comparing the alternatives is the No Action Alternative. The Forest Service predicts that all of the available volume in the nondeferred VCUs will be harvested by the end of the 1989 operating season. This Alternative assumes that no further volume would be made available to support the existing operations at Rowan Bay for the balance of the Operating Period ending December 31, 1990. This Alternative would result in the following:

1. As many as 170 existing jobs could be lost in the logging, sawmill, and pulp production industries. As many as 110 additional jobs could be lost in other related industries in Southeast Alaskan communities. These job losses could be avoided if new timber volume, that would otherwise not be harvested, could be made available from other sources.
2. The logging camp at Rowan Bay would be forced to close, and its 134 employees, dependents, support staff, and service personnel, such as the local school teachers, would have to seek employment elsewhere. The financial impact to these people would range from an estimate of \$134,000 to \$402,000. The social impacts associated with disruption of their existing life styles would be significant to those individuals.
3. There is a very strong probability that the short notice cancellation of existing logging contract volume would force the operations at Rowan Bay to be moved to another area or to be closed down until additional volume could be found elsewhere. The precise financial impact of such an event to APC is not known. A similar projected event to an independent logging contractor in Analysis Area 3 is expected to result in a combined loss of about \$6 million (Appendix A-4a, Draft SEIS).
4. The Alaska Wrangell mill currently relies very heavily upon timber made available under the APC Contract. Company officials have stated that a loss of this magnitude would cause them to reduce employment to a single shift, resulting in a loss of 80 jobs (Appen-

dix A-4b, Draft SEIS). A reduction to a single shift would also have the relative impact of doubling the fixed costs of the sawmill, according to its manager. The impact of such a change in the employment base of Wrangell would be major.

5. A no further harvest alternative in Analysis Area 12 would have severe consequences on the ability of the United States Government - Forest Service to meet its contractual obligations to the Alaska Pulp Corporation. The volume available from the other analysis areas being further evaluated in this Supplement is not sufficient to meet the contract needs and be within the SEIS time frame. The No Further Harvest Alternative would likely cause the Government to breach the terms of the Contract. Such a breach would likely result in a large damage claim.

Alternatives 2 through 5 provide varying amounts of timber, as described in this chapter. Given the current production rate of the logging operations at Rowan Bay, these alternatives would provide sufficient volume to keep the existing employment opportunities in place in Analysis Area 12 through mid- to late 1991. In supplying the most volume, Alternative 3 would provide the longest continued period of employment, followed by Alternatives 5, 4, and 2, respectively. Subsequent planning efforts would analyze continued harvest alternatives for Analysis Area 12 prior to 1991.

## **Issue 2: Costs and benefits associated with implementing the 1986-90 Operating Plan.**

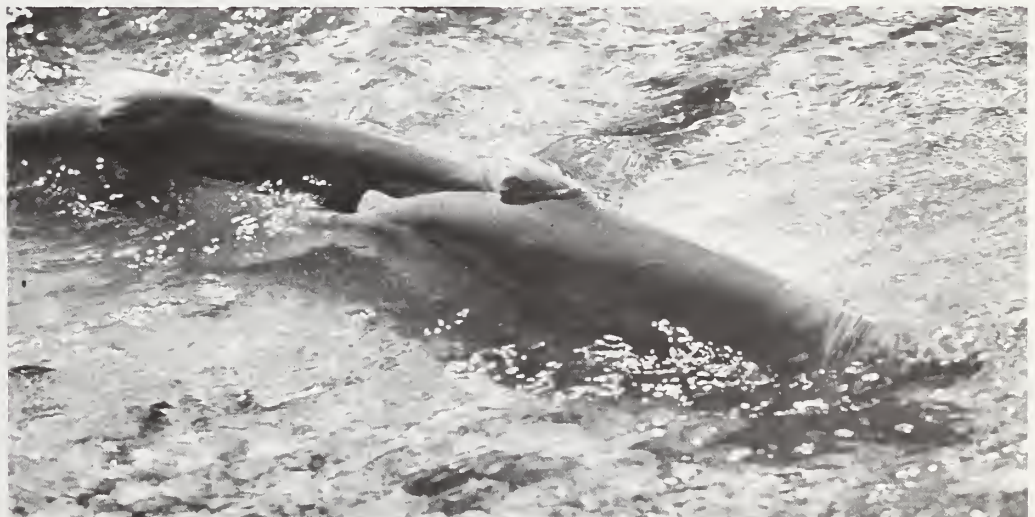
The No Action Alternative provides the baseline for comparing the impacts of this issue. The summary of cost/value analysis presented in the Economic Comparison below describes the dollar values maintained or forgone by each of the alternatives. The No Action Alternative could also impact the cost of operation at the APC Pulp Mill, where a volume disruption of this magnitude could cause the pulp mill to experience temporary shutdowns. The cost of a temporary shutdown is estimated by APC to be \$500,000, plus \$4,800 for every day of shutdown (Appendix A-4c, Draft SEIS). None of the alternatives would have any measurable direct effect on commercial fishing, recreation/tourism, or other sectors of the economy.

## **Issue 3: Effects of timber harvest and related activities on fisheries habitat.**

The No Action Alternative provides the baseline for comparing the alternatives. The assumptions made for the socioeconomic issue also pertain to the comparison of proposed timber harvest alternative effects on fisheries.

The evaluation in Chapter 4 shows that the potential effects on the fisheries resources evaluated are minimal. Forest Service staff followed the Alaska Region Aquatic Habitat Management Unit (AHMU) Guidelines (Forest Service 1986a) in developing the timber

*Spawning Salmon*





harvest alternatives to minimize the potential for impact on the valuable salmon and trout fisheries in Analysis Area 12. Adhering to the AHMU Guidelines during the formation of alternatives minimized the total stream bank miles affected, the number of stream crossings, and the amount of potential road construction within designated AHMUs. Site-specific prescriptions have been developed to minimize the potential for impact on the stream spawning and rearing habitat where it was necessary to encroach into an AHMU. The site-specific aquatic habitat management unit prescriptions are noted on the individual timber harvest unit cards, which are included in Appendix A-1. The planning record contains unit cards for all harvest units being evaluated. In addition, Forest Service staff carefully adhered to the Log Transfer Facility Siting Guidelines (Forest Service 1988a, Appendix G) in selecting a potential LTF site in Alternative 3 to minimize the potential impacts on crab rearing habitat in No Name Bay.

The range of potential stream crossings to be constructed varies from three in Alternatives 4 and 5 to four in Alternatives 2 and 3. Only Alternatives 3 and 5 propose to construct any road within an AHMU (0.3 mile for Alternative 5 and 1.0 mile in Alternative 3). Miles of proposed timber harvest within an AHMU ranged from 5 miles in Alternative 2 to 7.8 miles in Alternative 5. Miles of proposed timber harvest to stream banks of Class I or Class II streams varies from 1.4 miles or 0.67 percent of the habitat in Alternative 4 to 3.0 miles or 1.3 percent of the habitat in Alternative 3.



Nesting Habitat

#### Issue 4: Effects of timber harvest and related activities on wildlife habitat.

The No Action Alternative provides the baseline for comparing the alternatives. The assumptions made for the socioeconomic issue also pertain to the comparison of proposed timber harvest alternative effects on wildlife. Two points in time were used to evaluate the extent of potential wildlife effects. For comparison of the percent reduction of habitat capability, a point in time prior to data collection for the Tongass Land Management Plan was used (pre-1976). A point in time prior to any timber harvest was used to compare acres of emphasis species habitats affected.

The analysis in Chapter 4 shows that the potential effects on the wildlife resources evaluated are minimal (Tables 2-6 through 2-8). The range of differences for all habitat types between Alternative 1, the No Action Alternative, and Alternatives 2 through 5 (action alternatives) are all less than 3 percent.

Table 2-6

#### Projected Changes In Wildlife Habitat Capability Based on Models

		Alternative				
		1	2	3	4	5
Deer Habitat Capability						
Potential Reduction (individuals)	— <sup>1</sup>	88	166	134	147	
Potential Reduction (percent)	— <sup>1</sup>	0.9	1.6	1.3	1.4	
Pine Marten Habitat Capability						
Potential Reduction (individuals)	— <sup>1</sup>	8	25	13	9	
Potential Reduction (percent)	— <sup>1</sup>	0.9	2.8	1.5	1.0	

SOURCE: Forest Service in consultation with ADF&G (SEIS Planning Record) - see Appendix C-3, theme response on data adequacy and model use.

<sup>1</sup> No additional change.



Based on current habitat capability projections, Analysis Area 12 has the potential to support over 9,000 deer and over 500 pine martens, although the deer population has not recovered from the severe winters in the late 1960s and early 1970s. The potential effects on habitat capability by the proposed timber harvest alternatives range from 88 to 166 deer and 7 to 25 pine martens (Table 2-6). The potential percent reduction by alternative ranges from 0.9 to 1.6 percent for deer and 0.9 to 2.8 percent for pine marten.

Table 2-7 shows the acres of inventoried wildlife emphasis species habitat that would be affected by the proposed timber harvest alternatives along with the percent of remaining emphasis species habitat. Although the acres affected vary among the alternatives, the amounts are small by comparison with the total inventoried emphasis species habitat acres.

The Record of Decision for the 1986-90 Operating Period FEIS for the APC Long Term Timber Sale prescribed approximately 88,500 acres to be managed in Old Growth Habitat Condition for wildlife, of which approximately 39,200 acres are in Analysis Area 12. The prescription was to remain in effect until the next NEPA assessment. The Supplement shows the effect on that designated Old-Growth Habitat of the new alternatives considered in this

Table 2-7  
**Changes In Wildlife Habitat Due To Timber Harvest**

	Alternative				
	1	2	3	4	5
<b>Forested</b>					
Proposed Harvest (acres)	0	2,595	3,120	2,656	2,965
Percent Remaining	89	87	87	87	87
<b>Deer Winter Range</b>					
Proposed Harvest (acres)	0	573	408	307	307
Percent Remaining	92	91	91	92	92
<b>Inland Wetland</b>					
Proposed Harvest (acres)	0	0	204	40	64
Percent Remaining	97	97	96	97	97
<b>Beach Fringe</b>					
Proposed Harvest (acres)	0	0	0	0	0
Percent Remaining	95	95	95	95	95
<b>Estuarine Fringe</b>					
Proposed Harvest (acres)	0	0	0	0	0
Percent Remaining	98	98	98	98	98
<b>Streamside Riparian</b>					
Proposed Harvest (acres)	0	8	8	8	16
Percent Remaining	98	98	98	98	97

SOURCE: 1986-90 FEIS (Forest Service 1986b) with revisions from additional ground verification (SEIS Planning Record).

Table 2-8  
Changes in Old-Growth Habitat Conditions Due to Timber Harvest<sup>1</sup>

	Alternative				
	1	2	3	4	5
Old-Growth Conditions					
Proposed Harvest (acres)	0	499	138	165	204
Percent Remaining	100.0	98.7	99.6	99.6	99.5

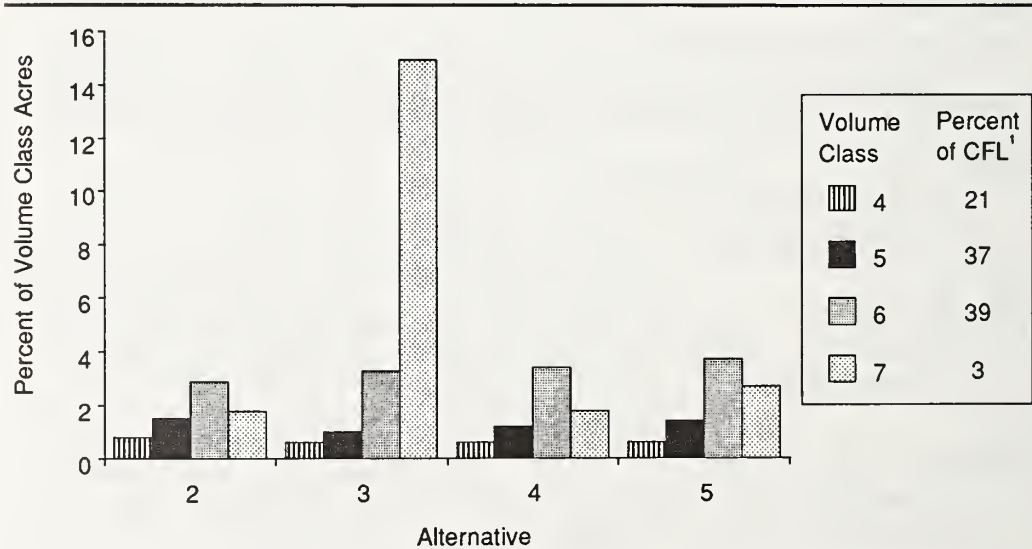
SOURCE: 1986-90 FEIS (Forest Service 1986b).  
<sup>1</sup> Term refers to old-growth as described on page 4-13, 1986-90 FEIS.

NEPA assessment. Table 2-8 shows the range of acres that would be affected and the percent of Old-Growth Habitat Condition remaining by proposed timber harvest alternative. Timber harvest effects shown for the emphasis species and emphasis habitats are indicative of the effects on other wildlife and their habitats.

Issue 5: Distribution of Harvest by Volume Class.

Table 2-9 summarizes the acres proposed for harvest by volume class. Figure 2-2 shows the cumulative percentage of acres in each volume class previously harvested or proposed for harvest under each alternative. For all of the alternatives, the majority of the cumulative harvest (over 50 percent) would come from Volume Class 6 timber, and would result in harvest of 2.9 to 3.7 percent of all Volume Class 6 timber in Analysis Area 12. Alternative 3 would result in harvest of more Volume Class 7 timber than the other alternatives, cumulatively about 15 percent of the Volume Class 7 timber in Analysis Area 12, compared with the 2 to 3 percent proposed by the other alternatives.

Figure 2-2  
Cumulative Percentage of Volume Classes, Including Proposed Harvest



SOURCE: Multi-Entry Layout Process database, Stikine Area Supervisor's Office, Petersburg, AK.  
<sup>1</sup> Value includes volume classes 4 through 7 only.

**Table 2-9**  
**Acres Proposed for Harvest**

Volume Class <sup>2</sup>	Alternative <sup>1</sup>			
	2	3	4	5
4	229	179	169	169
5	763	532	610	717
6	1,508	1,716	1,782	1,944
7	85	683	85	125
Total Acres	2,585	3,110	2,646	2,955

SOURCE: Multi-Entry Layout Process database, Stikine Area Supervisor's Office, Petersburg, AK.

<sup>1</sup> The No Action Alternative, Alternative 1, is not displayed as additional volume is not being proposed for harvest.

<sup>2</sup> Volume Classes 1 through 3 (not presented) contain less than 8 MBF/acre; Volume Class 4 contains 8-20 MBF/acre; Volume Class 5 contains 20-30 MBF/acre; Volume Class 6 contains 30-50 MBF/acre; and Volume Class 7 contains 50 or more MBF/acre.

Generally, harvest of high volume stands occurs in proportion to the amount of road construction planned to access unroaded areas (Forest Service 1986b, p.1-19). Alternatives 2 and 4 would harvest the least amount of high volume stands and a greater percentage of marginal stands, while also building the least amount of system road. Alternative 3 would harvest the greatest percentage of high volume stands, but would also construct a main arterial road and a LTF in No Name Bay.

### Issue 6: Log Transfer Facility (LTF) locations and potential environmental effects.

Only Alternative 3 (No Name Bay) proposes to build a new LTF; the other alternatives propose to use only the existing LTF at Rowan Bay. The detailed environmental effects of 8 alternative sites at No Name Bay are documented in an Environmental Assessment completed in April 1987 (Appendix B-1, Draft SEIS). The low-angled slide design proposed at Site 4 is expected to reduce the annual crab catch by 6.6 pounds, the weight of approximately two large adult male crabs. Forest Service analysis indicates negligible impacts would occur to salmon, crab, or herring fisheries. The possible impacts on subsistence resource users is discussed in more detail below.

### Issue 7: Effects on resource values of high-interest areas.

High-interest areas were defined based on public response, in the 1986-90 FEIS (Forest Service 1986b, p. 1-20). In Analysis Area 12, these areas were defined as being the east side of Port Camden (VCU 420) for fisheries and wildlife values. Others noted Kadake (VCU 421) and the southern half of the East Kuiu Management Area, Alvin Bay (VCU 416), No Name Bay (VCU 417), Seclusion Harbor (VCU 418), and Threemile Arm (VCU 419) as priorities for interim protection until the revision of TLMP.

Alternative 2 would not harvest any units identified in 1986-90 FEIS as "high interest," but would propose 6 units along the western side of Security Bay, an area not selected for harvest in 1986-90. Alternative 3 proposes harvesting 16 units in the deferred area of East Kuiu (VCUs 416 to 419). Alternatives 4 and 5 propose harvesting 2 units in the Kadake Creek drainage (VCU 421). Chapter 4 contains a more detailed discussion of the impacts on resources of concern in these areas.



## 2 Alternatives

### **Issue 8: Effects on visual, recreation, and wilderness resources.**

**Visual Resources:** Alternative 1 would maintain the current visual condition of Analysis Area 12. Of the action alternatives, Alternative 4 would have least effect on the visual character of North Kuiu Island. Overall, the proposed activities meet the assigned VQOs with the exception of activities seen from Kadake Creek (VCU 421).

Alternative 2 proposes activities on the west side of Security Bay (VCU 400) as well as those proposed in Alternative 4. Security Bay would appear in a modified condition, with harvest activities and the private residence on the east side of Security Bay evident from the state marine park.

Alternative 3 includes activities in No Name Bay (VCU 417), Seclusion Harbor (VCU 418) and the Tebenkof area (VCU 405.1) in addition to those proposed in Alternative 4. The visual character of No Name Bay would appear in a modified condition, considering the combined effects of the harvest units and log transfer facility.

Alternative 5 includes activities along the northern shore of Threemile Arm as well as all those proposed in Alternative 4. As seen from Threemile Arm the two most southern units would not meet the assigned VQOs.

**Recreation Resources:** All of the action alternatives propose new roads and harvest units, increasing recreational access to interior sections of the Island.

*Security Bay*



*Early Morning School Boat at Port Protection*



An analysis of individual cutting units and their relationship to known use sites indicates that Alternative 2 would cause the greatest impact to the recreation experience (i.e., waterfowl hunting) with road construction west of Security Bay (VCU 400). Harvest activities in Alternative 3 would impact a developed trail serving the Tebenkof Bay Wilderness (VCU 418). Alternatives 4 and 5 would result in the least effects. None of the alternatives is expected to significantly influence recreation growth because they will change neither the access nor the resources that provide recreational demand. Current use is fairly low in comparison to total use in the Stikine area (See Figure 3-6). No impacts are anticipated on the experiences of recreation cabin users.

More detailed information on visual, recreation, and wilderness resources can be found in Chapter 4, Environmental Consequences.

## Issue 9: Effects of proposed activities on subsistence uses

The ANILCA Section 810 Subsistence Evaluation in Chapter 4 found that none of the Analysis Area 12 alternatives would cause an immediate or reasonably foreseeable significant possibility of a significant restriction of subsistence use of wildlife, fish and shellfish, and other food resources. The evaluation further found that enough is known about foreseeable programmatic Forest Service activities and other potential activities to project that the cumulative effects may possibly restrict subsistence uses.

**Management Concern (from the 1986-90 FEIS):** Use of nonstandard logging systems. Timber harvest calculations in TLMP anticipated that a portion of the volume for APC would come from areas requiring use of nonstandard logging systems such as helicopters or long-span skylines (over 2,600 feet). Because the timber market reached a decade low, all of the 1986-90 alternative units were designed to use standard systems. For the brief period remaining in the SEIS, none of the new alternatives has explored the use of nonstandard logging systems.





## 2 Alternatives

Management Concern (from the 1986-90 FEIS): Development of area-wide transportation system.

Management Opportunity (from the 1986-90 FEIS): Interconnect existing road systems.

Management Opportunity (from the 1986-90 FEIS): Reducing the administrative costs and risk to employees through increasing road access to work areas and by reducing the use of aircraft, specifically helicopters.

These three concerns/opportunities are closely related. From a management perspective, increasing access to more areas disperses the impacts of timber harvesting. Reducing the use of aircraft would decrease the risk of loss of life for Forest Service and APC employees as well as reducing administrative costs. Because no state/public transportation system connecting with the Forest road system exists on Kuiu Island, no public transportation network benefits would accrue. Only Alternative 3, which proposes road construction into Seclusion Harbor and No Name Bay (VCUs 417 and 418), would increase the potential for responding to these concerns and opportunities.

Management Opportunity (from the 1986-90 FEIS): Increase harvest unit size to optimum, consistent with Regional Guide Policy and protection of other resource values.

The Regional Guide for Alaska requires that timber harvest units in Alaska not exceed 100 acres, unless exempted for specific reasons described in the Guide (Forest Service 1983). Protection of other forest resources may require units to be smaller than 100 acres. Among the alternatives, the average unit size differs very little, ranging between 55 acres under Alternative 5 to 61 acres under Alternative 4. Six harvest units exceed 100 acres as follows: in VCU 420 harvest unit 4 is 109 acres and harvest unit 13 is 108 acres; in VCU 421, harvest units 6, 19, and 31 are 116, 104, and 111 acres respectively; harvest unit 14 in VCU 417 is 101 acres in size. The reasons for the larger harvest units are documented in Volume III of the 1986-90 FEIS (Forest Service 1986b). Units may exceed 100 acres in size due to transportation and harvest system requirements and a concern for blowdown hazards. In designing the action alternatives, the Stikine Area interdisciplinary team planned unit sizes to protect the most resources possible, thus accomplishing this management opportunity.

*Logging at Rowan Bay*



**Management Opportunity (from the 1986-90 FEIS):** Maintenance of local economics. Please refer to the discussion of the socioeconomic issue above.

**Management Opportunity (from the 1986-90 FEIS):** Increase the productivity of the timber resource.

The depressed markets for lumber and pulp timber products of the early 1980s have been steadily rebounding. The opportunity now exists to increase the production of timber products to levels anticipated by the TLMP schedule and as projected under the terms of ANILCA. All of the action alternatives would place varying portions of the operable timber lands under intensive management, increasing the productivity of the timber resource. The No Action Alternative, however, would not provide this management opportunity. Alternative 3 (No Name Bay) and Alternative 5 (Threemile Arm) would provide earlier conversion of more acres of high-volume stands than either Alternative 2 (West Security Bay) or Alternative 4 (North Kuiu).

**Management Opportunity (from the 1986-90 FEIS):** Maintain important fish and wildlife habitat.

Please refer to the discussion of the fisheries habitat and wildlife habitat issues above.

**Management Opportunity (from the 1986-90 FEIS):** Defer timber harvest and related activities in certain areas during the 1986-90 Operating Period.

Please refer to the discussion of the high-interest areas above.

**Management Opportunity (from the 1986-90 FEIS):** Make timber available to meet the Contract obligation.

Please refer to the discussion on the effectiveness of the alternatives.

**Management Concern (current management concern):** If the US Congress had enacted House Bill 1516, it would have placed a moratorium on developments in the deferred portion of East Kuiu Management Area (VCUs 416, 417, and 418) until completion of the Tongass Land Management Plan revision. The timber volume previously planned for harvest in these VCUs would be unavailable to meet Forest Service contractual commitments. Other unroaded or currently roaded VCUs within the Long-Term Sale Contract area would need to be entered to provide an equivalent amount of timber for harvest.

The new Congress is in the process of considering legislation similar to House Bill 1516. This legislation, known as the "Tongass Timber Reform Act," passed the House of Representatives on July 31, 1989 as H. R. 987. The companion bill, S. B. 346, has not yet been considered by the Senate. Decisions affecting VCUs 416, 417, and 418 that are outside the scope of the SEIS will probably be made by one of several processes. These processes may include legislation, revision of the Tongass Land Management Plan, analysis area planning, and/or EISs to be prepared for future operations. In accordance with planning direction provided by the Regional Forester, one alternative (Alternative 3) considered in this Draft, would include entry into the VCUs listed in House Bill 1516 and H. R. 987. The remaining action alternatives would not propose entry into the deferred VCUs.

**Management Concern (current management concern):** The scope of activities proposed by the Supplemental EIS is constrained by a narrow time frame between the approval of the Record of Decision for this supplement and the end of the Operating Period.

The planning constraints that apply to this SEIS effort are documented in the Consolidated Appendix, Volume III, I. The logistical problem is one of providing the balance of 1986-90 contractual volume while maximizing the potential for APC to log this volume during the balance of the Plan period. Volume not harvested by the end of the Operating Period will be available for transition into the 1991-95 Operating Period. Large amounts of road or other



## 2 Alternatives

construction activities that need to be completed prior to making harvest units available reduce the potential of an alternative to respond to this concern. Alternative 4 constructs the least amount of new road for the volume made available and relies more heavily on timber adjacent to existing roads. Alternative 3 constructs the most road as well as the log transfer facility at No Name Bay. The potential logistical problems associated with implementing this alternative make it less desirable than Alternative 2, 4, or 5.

### Economic Comparison

The economic consequences of the alternatives would differ. All alternatives except Alternative 1, No Action, would contribute volume to dependent industry in Southeast Alaska. The number of jobs and economic activity generated varies with the harvest level.

Estimates of the number of jobs to be maintained varies from 7 to 11 jobs per million board feet. For the purposes of this analysis 8.5 jobs per MMBF<sup>1</sup> annually with an average value of \$23,200 per job is used (Forest Service 1989b). Based on this figure, the economic contributions toward maintenance of jobs is displayed in Table 2-10. None of the alternatives are expected to affect employment in either the commercial fishing or recreation/tourism or related sectors of the economy.

The comparison of alternatives used the Region 10 Timber Appraisal Handbook (Forest Service 1986a) with Base Year 1986 costs adjusted to the quarter ending in June 1988. Appraisal logging costs, transportation costs, and manufacturing costs were developed for the action alternatives and are displayed below (Table 2-11). Also developed through the appraisal process are estimates of timber selling values and margin of profitability for the logger of average efficiency (Table 2-12).

- Comparison of Alternatives:

Alternatives 3 and 5 would indicate the greatest return per volume to be harvested, followed closely by Alternative 4. Alternative 2 would return the least value per cost. This is closely related to the number of jobs generated by each alternative, with Alternatives 3 and 5 generating the greatest number of jobs and Alternative 2 generating the fewest jobs. The No Harvest Alternative indicates a loss of 417 jobs during the balance of the 1986-90 Plan period.

### Effectiveness Comparison

A brief analysis of the effectiveness of alternatives in meeting management objectives discussed earlier in this chapter revolved around discussion of the following three considerations:

- How well each alternative meets the intent of implementing the Tongass Land Management Plan guidelines for a LUD IV area.
- How well the alternative meets the range of volume need projected in the Phase I SEIS to meet Alaska Pulp Corporation contractual obligations.
- How likely the alternative is to be implementable in terms of public controversy.

#### Alternative 1 - No Action-Current Direction and No Further Harvest

This alternative would continue activities agreed to in the *Tenakee Springs v. Courtright* settlement agreement. No additional harvest would be authorized until a subsequent EIS could be completed. This alternative would not facilitate development of additional transportation system into new areas and is considered lowest in its effectiveness for implementing guidelines for LUD III and LUD IV areas and lowest in effectiveness for providing contract volume to APC.

Selection of this alternative may result in a high level of public controversy. Closing of the

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<sup>1</sup> The figure 8.5 jobs per MMBF represents an annual harvest per year. Since SEIS cannot precisely schedule harvest of volume over time, the comparison of alternatives is not directly tied to an annual basis.

APC Pulp Plant in  
Sitka, Alaska

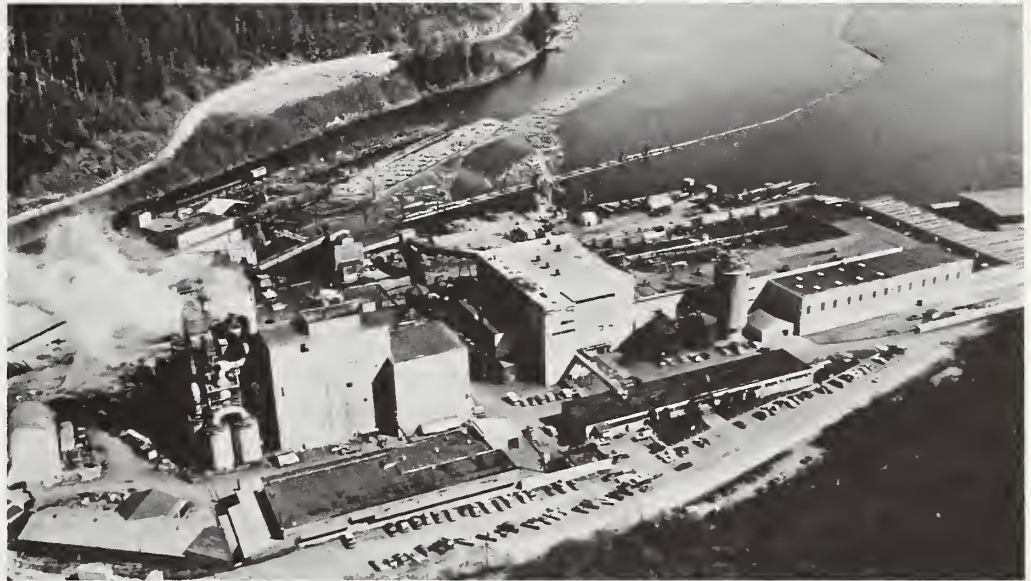


Table 2-10

## Economic Contribution of Alternatives

	1	2	3	4	5
Volume of Harvest (MMBF)	-49.1	87.4	124.8	93.8	105.3
Jobs Maintained	-417	743	1,061	797	895
Value from Wages (Million\$)	-9.6	17.2	24.6	18.5	20.8

SOURCE: Timber Supply and Demand, Draft 1988 Report (Forest Service 1989b).

Table 2-11

## Costs to an Operator of Average Efficiency (Million\$)

	2	Alternative		
		3	4	5
Logging Costs	11.1	15.5	12.0	13.4
Transportation Costs	7.9	11.8	7.8	9.5
Manufacturing Costs	22.2	31.6	23.8	26.7
Total	41.2	58.9	43.6	49.6

SOURCE: Timber Supply and Demand, Draft 1988 Report (Forest Service 1989b).

Table 2-12

## Values to an Operator of Average Efficiency (Million\$)

	2	Alternative		
		3	4	5
Timber Selling Values	44.6	63.5	47.8	53.6
Margin of Profit	5.7	8.2	6.0	6.9
Total	50.3	71.7	53.8	60.5

SOURCE: Timber Supply and Demand, Draft 1988 Report (Forest Service 1989b).





Rowan Bay logging camp and relocation of the camp's 134 residents would be necessary. If this alternative were selected, additional results would be a reduction in the potential supply of wood to the Wrangell sawmill, resulting in the loss of approximately 80 jobs, and reduction of pulp supply to the APC pulpmill in Sitka. This alternative would require the Forest Service to attempt to provide sufficient volume in other parts of the APC Contract area, and has the probability of causing the Forest Service to breach contractual obligations.

## **Alternative 2 - West Security Bay**

Alternative 2 proposes harvest along the western side of Security Bay. This portion of VCU 400 had not been proposed for harvest activities in either the 1981-86 or 1986-90 FEISs, because, in the opinion of the Forest Supervisor, the resource values associated with this watershed, fisheries, and estuary far outweighed those in the southern half of the East Kuiu Management Area (VCUs 416, 417, and 418). For the purposes of this analysis, entry into the West Security Bay area was the "trade off" for not entering the moratorium areas in No Name Bay and Seclusion Harbor.

Selection of this alternative would result in additional access into two previously unroaded areas with the construction of 27 miles of system road. It would also provide approximately 87.4 MMBF of volume to meet the APC contractual needs, which is in the middle of the range identified in Phase I of the SEIS. This alternative is considered low to moderate in effectiveness to implement TLMP guidelines of LUD IV VCUs.

The potential for public controversy and concern with implementing this alternative are viewed as moderate to high. With harvest proposed within the viewshed of a state marine park and privately owned land, combined with Security Bay's scenic nature and high fisheries values, it is reasonable to expect some public controversy over this alternative.

## **Alternative 3 - No Name Bay**

This alternative proposes activities similar to those approved in the Records of Decision for 1981-86 and 1986-90 FEISs.

This alternative, if selected, would construct the No Name Bay LTF and connect the road system between Rowan Bay and No Name Bay. Alternative 3 would harvest approximately 124.8 MMBF and construct 37 miles of system road, providing access into three unroaded areas. This alternative is rated highest in meeting APC contractual volume needs identified in Phase I of the SEIS and in implementing TLMP guidelines for a LUD IV area.

This alternative is associated with the greatest potential of public controversy. No Name Bay, Alvin Bay, and Seclusion Harbor (VCUs 416, 417, and 418) were identified as moratorium areas in House Bill 1516 and are proposed for Wilderness designation in H. R. 987. Also, public controversy remains high concerning construction of a LTF in No Name Bay.

## **Alternative 4 - North Kuiu**

This alternative concentrates harvest along the existing transportation system and would construct 23 miles of system road into a single previously unroaded area. If selected, this alternative would harvest approximately 93.8 MMBF of timber, which falls in the high end of the volume range identified in Phase I to meet APC contract needs. Alternative 4 is rated as moderate in effectiveness in terms of implementing guidelines in a LUD IV area and high in providing volume for APC contractual needs.

This alternative is judged as likely to cause the least public controversy. It does not propose harvest in any areas of known controversy from scoping efforts, and it minimizes construction of road into previously unroaded areas.

### **Alternative 5 - Threemile Arm**

This alternative is similar to Alternative 4, but provides for additional road construction and harvest units along the northern shore of Threemile Arm (VCU 419).

If selected, this alternative would harvest approximately 105.3 MMBF, which exceeds the upper end of the volume range identified in the Phase I SEIS to meet volume obligations to the APC Contract. This alternative proposes to construct system road into two previously unroaded areas and is rated high in effectiveness to implement guidelines for TLMP LUD IV VCUs and provide APC contract volume.

The potential for public controversy associated with this alternative is considered equal to the proposal for Alternative 4, which is low.

## **Standards, Guidelines, and Mitigation Measures**

Numerous mitigation, enhancement, and preventative measures that are used by the Forest Service are defined in several Forest Service Handbooks, the Alaska Regional Guide (Forest Service 1983), and the Tongass Land Management Plan (Forest Service 1979a, 1986d). Many of these guides were described in detail in the 1981-86 FEIS (Forest Service 1980a, Section III, Planning Alternatives and Recommendations) and in the 1986-90 FEIS (Forest Service 1986b, Subsection 2c). No new specific standards and guidelines were developed for the remainder of this Operating Period. Specific mitigation measures, as applied to each individual unit, can be seen on "As Planned" unit layout cards. These unit cards are an important tool for implementing the project as they list standards and guidelines and provide a mechanism for tracking the project implementation. They are reproduced in Appendix A-1. Unit cards also contain an evaluation of the potential effectiveness for the mitigation measures proposed.

## **Identification of the Forest Service Preferred Alternative**

The Stikine Area management team evaluated the benefits and impacts of each alternative against the issues discussed in the Comparison of Alternatives Section to recommend the preferred alternative. Alternative 5, continuing entry into Threemile Arm is tentatively identified as the Forest Service preferred alternative, pending further evaluation in the Record of Decision.





# **Chapter 3**

## **Affected Environment**







# Chapter 3

## Affected Environment

This chapter provides information about the existing environment of Analysis Area 12 that may be affected by implementing any of the alternatives described in Chapter 2. It includes discussions of soils, vegetation, access, log transfer facilities, timber volume, wildlife, fisheries, watersheds, marine environment, land status, recreation, visual characteristics, cultural resources, socioeconomics, and subsistence. The information presented here augments and summarizes sections addressing the affected environment of the 1981-86 and 1986-90 FEISs and the Phase I SEIS. The area designated as Analysis Area 12 is located on Kuiu Island and is approximately 295,596 acres (1,997 acres of which are privately owned). Most of Analysis Area 12 was considered in the 1986-90 study area. Analysis Area 12 is comprised of four management areas and 15 VCUs as follows:

- North Kuiu Management Area S04: VCUs 398, 399, 400, 401, 402, and 421
- Pillars Management Area S05: VCU 403
- East Kuiu Management Area S09: VCUs 405.1, 416, 417, 418, 419, 420
- Rocky Pass Management Area S12: VCUs 427 and 428

VCU 405.1 is the nonwilderness portion of VCU 405. VCUs 427 and 428 are partial VCUs, with the other portions extending out of the analysis area into western Kupreanof Island.



## Soils

The development of soils in Southeast Alaska is influenced by high levels of rainfall, cool summer temperatures, a short growing season, and moderately low soil temperatures. Under such conditions, organic matter decomposes slowly and tends to accumulate in areas where it is being produced. Because of the high rainfall, the available nutrients can be leached rapidly, and exposed mineral soils are subject to erosion. Glacial history has played an important part in the placement and character of soil parent material in many places. The characteristics of the parent material, the topography, vegetation, and the soil development factors all influence the features of soils that affect and are affected by timber harvest activities.

Soil productivity and nutrient status can be influenced in a number of ways. Removing the canopy of mature and overmature forest allows increased solar radiation to penetrate and warm the soil. This process leads to a temporary rise in available soil nutrients, particularly nitrogen. The result is a proliferation of rapidly growing forbs, shrubs, and tree seedlings. Consequently, the total annual biomass production may be greater than it was in the slow growing forest. Thus, total soil productivity increases, at least temporarily, after logging. The duration of the increase is not known. However, many soils hold a high percentage of their stored plant nutrients in the duff (organic humus) layer on or within a few inches of the surface. Removing the duff layer can reduce the supply of available plant nutrients and soil productivity. Without the trees to recycle nutrients, some are lost through leaching; but because of the large accumulations of surface organic matter and the rapid regrowth of vegetation, such losses are negligible.

Most undisturbed soils in Analysis Area 12 are very resistant to surface erosion. Thick layers of surface organic matter and surface mats of vegetation act as protective covers that minimize surface erosion. Locations vulnerable to surface erosion and mass wasting (landslides) exist, however, including stream banks, snowslide or avalanche slopes, and V-notches. The potential for sediment production is based upon those soil properties that influence the ability to produce sediment when a site is disturbed by natural or management-induced means. These include erodibility, mass wasting hazard, amount of mineral solid material available as sediment, amount of unvegetated or bare soil, and the effect of climatic influence.

Soil mass movement is the dominant process of natural erosion in Southeast Alaska. The Forest Service has inventoried over 3,800 natural, large scale landslides that have occurred in the Tongass National Forest within the past 150 years (Forest Service 1977). Many landslides occur during, or immediately after, periods of heavy rainfall when soils are saturated. Particularly hazardous areas are steep slopes characterized by compacted glacial till or bedrock sloping parallel to the surface. When subjected to heavy rainfall, these areas have a high likelihood of mass movement, especially if disturbed by blasting during periods of soil saturation, side casting of excavated material, or logging practices that cause substantial surface disturbance.

Recent research on landslides in Southeast Alaska (Swanston 1989) has concluded that most landslides occur in unique topographical situations (slopes in excess of 75 percent hillslope depression). Although over 90 percent of all landslides in the past 20 years were not related to logging or roads, logging and roads do increase the potential for landslides in a given site. Naturally occurring slides tend to be larger and travel farther than logging related slides. Only three percent of all slides reach anadromous fish streams.

Vegetation, tree roots in particular, seems to have a stabilizing effect on slopes. Tree roots tend to decrease significantly in strength five to seven years after the tree is cut. This decrease in soil holding capability results in a high likelihood of soil movement on steep slopes following clearcutting. Further, the displaced roots of uprooted trees can disturb the soil mantle whenever windthrow occurs. Under natural conditions, windthrow is an important triggering device of debris avalanches and flows in Southeast Alaska. The degree of predictability is complicated by an interaction of factors such as soil depth, texture, and coarse fragment content.

Landslide hazard classes are used to group soil/landtype units that have similar properties regarding the stability of natural slopes. Three classes; high, moderate, and low; rank soil/land type units according to their relative potential for mass wasting. The Forest Service is primarily concerned with high hazard soil/landtype units that are the least stable and have the greatest probability of slope failure. These include most well drained soils on slopes of 75 percent or greater, as well as some soils with restricted drainage on slopes in excess of 65 percent. Nearly all naturally occurring landslides occur in units of this class. These areas often have visible indications of instability or past failures, such as slide scarps, tension cracks, or jack-strawed trees. There are no harvest units or roads in Analysis Area 12 located on these high hazard soils.

Table 3-1 displays soil hazard areas by VCU in Analysis Area 12 from data collected in two separate surveys. The planning record contains map overlays showing the locations of these hazard areas. The Tongass Land Management Plan (TLMP) inventory data were based on a statistical sampling method involving photo interpretation at randomly selected points. Its extreme hazard class includes V-notches at frequencies less than 1/2 mile, areas with a high amount of natural downslope movement, and slopes in excess of 75 percent. The data from the soil resource inventory of the Stikine Area are from a spatial inventory based on polygons rather than points. These have been classified according to soil properties and have been field verified. Project planning is based on this inventory rather than TLMP. Both surveys designated a similar total area in the highest hazard classes where no timber harvest is planned.

Table 3-1

**Soil Hazard Areas**

VCU	Greater than 75% Slope <sup>1</sup>		Extreme Hazard <sup>1</sup>		High Hazard <sup>2</sup>	
	<i>Acres</i>	<i>Percent of CFL</i>	<i>Acres</i>	<i>Percent of CFL</i>	<i>Acres</i>	<i>Percent of CFL</i>
398	0	0	71	1	70	1
399	1,372	7	1,715	8	2,056	10
400	2,611	12	3,109	14	2,041	9
401	3,619	44	3,898	47	4,410	54
402	1,611	8	1,997	10	509	3
403	1,934	11	2,191	12	2,385	13
405.1 <sup>3</sup>	— <sup>3</sup>	— <sup>3</sup>	— <sup>3</sup>	— <sup>3</sup>	32	4
416	80	1	80	1	1,213	9
417	156	2	390	4	230	3
418	575	9	1,149	17	565	8
419	375	3	450	4	1,395	13
420	1,493	9	1,792	11	2,247	14
421	444	2	2,292	10	2,430	11
427 <sup>3</sup>	— <sup>3</sup>	— <sup>3</sup>	— <sup>3</sup>	— <sup>3</sup>	238	— <sup>3</sup>
428 <sup>3</sup>	— <sup>3</sup>	— <sup>3</sup>	— <sup>3</sup>	— <sup>3</sup>	248	— <sup>3</sup>
Total	14,270	8	19,134	11	20,069	11

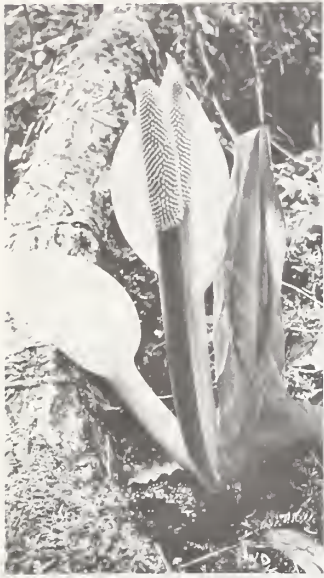
NOTE: The above data includes commercial forest land only. Acres of noncommercial forest land and nonforest land are not included regardless of hazard class.

<sup>1</sup> Tongass Land Management Plan aerial photo points inventory, Forest Service Region 10, Juneau, AK.

<sup>2</sup> Soils resource inventory of the Stikine Area (Kissinger 1988).

<sup>3</sup> Original Tongass Land Management Plan data are not available for partial VCUs.





Yellow Skunk-Cabbage,  
*Lysichiton Americanum* Hult.  
and St. John

## Vegetation

Western hemlock-Sitka spruce forests dominate the overstory of the Southeast Alaska rain forest. The understory is composed of shrubs such as blueberry, red huckleberry, rusty menziesia, and devil's club; and the forest floor is covered with a mat of mosses, liverworts, and plants such as five leaved bramble, bunchberry dogwood, fernleaf goldthread, and skunk cabbage. Streamside riparian vegetation is characterized by salmonberry, devil's club, alder, grasses, ferns, and currants.

Muskegs, dominated by sphagnum mosses, sedges, and shrubs of the heath family, are interspersed among low elevation timber stands where drainage is restricted. Trees are sparse and consist mainly of stunted hemlock, shore pine, and Alaska-cedar.

Common marine plants in near-shore waters include brown, red, and green algae, and eelgrass. Tide flats are found at the heads of many of the bays and estuaries and are usually associated with stream estuaries. The tide flats generally support sea milkwort, glasswort, and algae. Beach meadows occur between the shore and the forest. Lower beach meadows are composed of beach ryegrass, reed bent grass, hairgrass, fescue grass, beach lovage, goose tongue, and sedges. Upper beach meadow plants include yarrow, bedstraw, starwort, ferns, western columbine, and cow parsnip. Oregon crabapple, alder, devil's club, and blueberry occur along the border of the beach meadow and the forest.

At elevations generally above 2,000 feet, the plant communities are characterized by low shrubs, grasses, and sedges. Subalpine forests and meadows occur at the interface between the forested communities and the alpine tundra.

Currently, there are neither listed nor candidate threatened or endangered plant species located in Southeast Alaska or the APC Contract area (Murray and Lipkin 1987).

## Threatened and Endangered Species

## Timber

Western hemlock and Sitka spruce dominate timber stands throughout Southeast Alaska and Analysis Area 12. Other timber species include western redcedar, Alaska-cedar (also known as yellow-cedar), mountain hemlock, cottonwood, red alder, and shore pine.

Western hemlock and Sitka spruce develop best on well drained valley bottoms and lower slopes. However, they occur anywhere between sea level and timberline. Both are harvested for commercial purposes.

Western redcedar is found on Kuiu Island, but does not extend northward throughout the rest of the APC Contract area. Both western redcedar and Alaska-cedar represent a minor component (less than 10 percent) of the timber stands in Analysis Area 12. Alaska-cedar is interspersed in stands throughout the APC Contract area and is a highly valued commercial species.

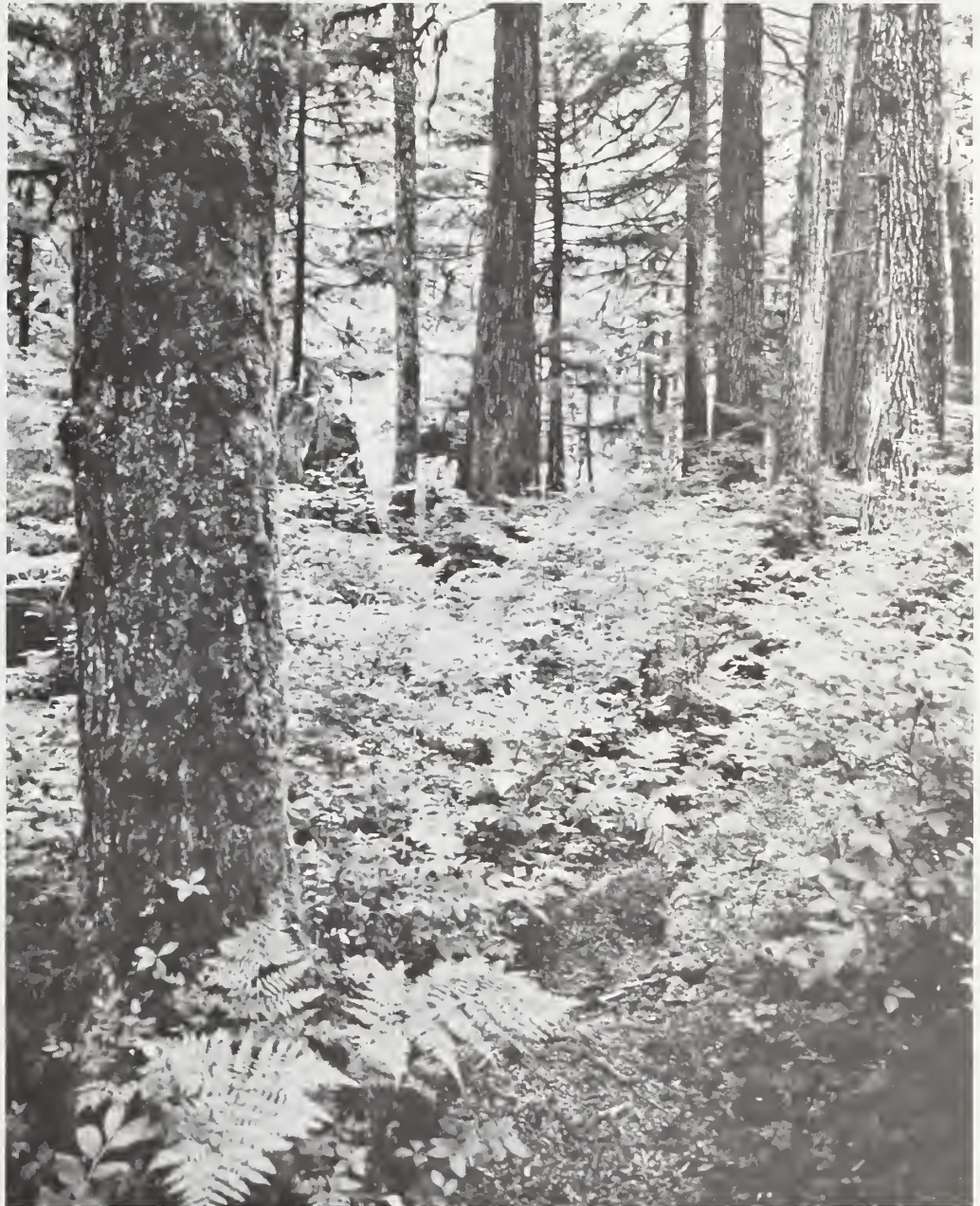
Noncommercial species include red alder, which is often found along beaches and streams and on steeper slopes where soils have been highly disturbed, such as logging unit landings. Shore pine (also called lodgepole pine) is found in muskegs.

Much of the commercial forest land in the Tongass National Forest that has not been previously harvested has been undisturbed for centuries and is considered mature or overmature. These stands are also commonly referred to as climax plant communities, or old-growth forests. In this document, "old-growth forest" refers to a habitat type characteristic of some mature and overmature stands. The affected "old-growth forest habitat" environment is discussed in Chapter 3, Wildlife.

Mature and overmature stands have an uneven appearance because they contain trees of many ages, sizes, and condition, with many dead tops and snags. In contrast, stands that have been

## Mature and Overmature Timber





disturbed during the last 100 to 200 years by fire, landslide, windthrow, or logging have a more uniform appearance because they contain trees of relatively uniform age and size with fewer snags and defective trees. Even-aged stands become mature as insects, disease, wind, and ice weaken and kill trees, opening up the stand for new growth to enter. The change from even-aged to uneven-aged to all-aged is continuing. Harvested mature stands are returned to even-aged stands as they regenerate.

Based on past forest inventories, overmature stands are assumed to have reached an equilibrium in productivity, where they no longer increase in biomass. Establishment of new trees depends on the death of existing trees, which provides space in the stand and sunlight through the canopy. Most of the timber in mature and overmature stands is of declining commercial quality, but suitable for the production of pulp. Intermixed in mature stands, however, are some of the finest quality Sitka spruce and western hemlock found anywhere.





## Commercial Forest Land

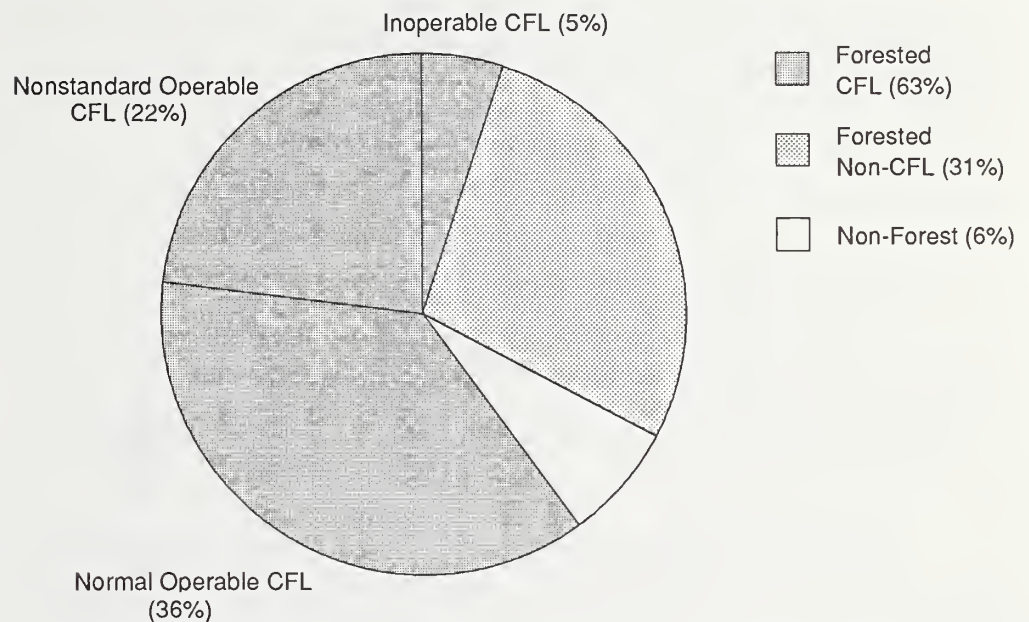
Depending on its vegetative cover, land in the Tongass National Forest has been categorized as commercial forest land (CFL), noncommercial forest land, or nonforest using the TLMP aerial photo point inventory (Figure 3-1). Approximately 65 percent of the land in Analysis Area 12 consists of CFL, which is land producing or capable of producing continuous crops of timber that have not been withdrawn from the timber base by statute or administrative action. The Forest Service has specified that in order to be capable of commercial timber production, the land must be able to produce 20 cubic feet/acre/year, or 8 thousand board feet (MBF)/acre/year (Forest Service 1978). Mature, overmature, and second-growth stands, as well as areas that have been logged and/or regenerated, are considered CFL. Commercial forest land also includes accessible and inaccessible areas.

Non-CFL makes up about 28 percent of Analysis Area 12. Non-CFL is forested land that is not capable of producing commercial quantities or has been withdrawn from the timber base. The remaining 7 percent of Analysis Area 12 is classified as nonforest and includes salt marshes and estuaries, alpine areas, and nonvegetated mountain tops, some of which may be glaciated or covered with permanent icefields.

Commercial forest land in the Tongass National Forest has been classified into volume classes. Each volume class represents a range of timber volume that could be expected for each acre. Placing the timber in volume classes allows the Forest Service to roughly estimate the volume for each VCU. Volume Classes 1 through 3 include CFL containing less than 8 MBF/acre. Volume Class 1 includes nonstocked stands that have been recently burned or logged. Seedling/sapling stands with less than 8 MBF/acre are placed in Volume Class 2, and pole timber stands with less than 8 MBF/acre are placed in Volume Class 3. Timber in Volume Class 4 contains 8 to 20 MBF/acre; in Volume Class 5, 20 to 30 MBF/acre; in Volume Class 6, 30 to 50 MBF/acre; and in Volume Class 7, greater than 50 MBF/acre.

Acres of CFL in each volume class have been estimated for Analysis Area 12 using the TLMP aerial photo point inventory and the Multi-Entry Layout Process (MELP) stand examination inventory. Both estimates are presented in Figure 3-2. TLMP data are statistically accurate for

Figure 3-1  
**Percentage of Timber Land Types in Analysis Area 12**



SOURCE: Tongass Land Management Plan aerial photo points inventory, Forest Service Region 10, Juneau, AK.

the Tongass National Forest, however, they become less accurate when broken down by Analysis Area or VCU. Nevertheless, the information is important because it provides a link between Tongass National Forest comprehensive planning and APC Contract area planning. Although TLMP data are not always used for site planning or impact analyses, they are presented by the Forest Service to ensure that the APC Contract area plan and other site specific plans are consistent with the TLMP.

Table 3-2 presents the distribution of acreage by VCU for Volume Classes 4 through 7 as was estimated from the MELP stand examination inventory. The data presented in Table 3-2 were used to estimate volumes proposed for harvest under each alternative, shown in Chapter 2, Tables 2-1 through 2-4.

Commercial forest land is further classified as inoperable CFL, normal operable CFL, or nonstandard operable CFL (see Figure 3-1 for the distribution in Analysis Area 12). Interspersed inoperable stands are those in which potential resource damage or physical limitations make harvest of trees uneconomical or impractical. The primary difference between normal operable and nonstandard operable CFL is that normal stands have less potential for erosion and slope failure than nonstandard stands.

Because of their lower erosion potential, normal operable stands may be logged using common systems, including 1,250-foot high lead; 1,000-foot short-span skyline; 1,000-to 2,000-foot intermediate-span skyline; 2,000- to 2,600-foot long-span skyline; cold, deck, and swing-track loader; or A-frame. Logging nonstandard operable stands could result in soil erosion or slope failure if careful logging techniques are not used. Therefore, nonstandard yarding techniques, which result in less impact on soils than the common methods listed above, may be employed to log nonstandard operable stands. Nonstandard techniques include: multispan skyline; long-span skyline over 2,600 feet; and helicopter yarding systems.

## Operable and Inoperable CFL



Figure 3-2

## Acres of CFL by Volume Class

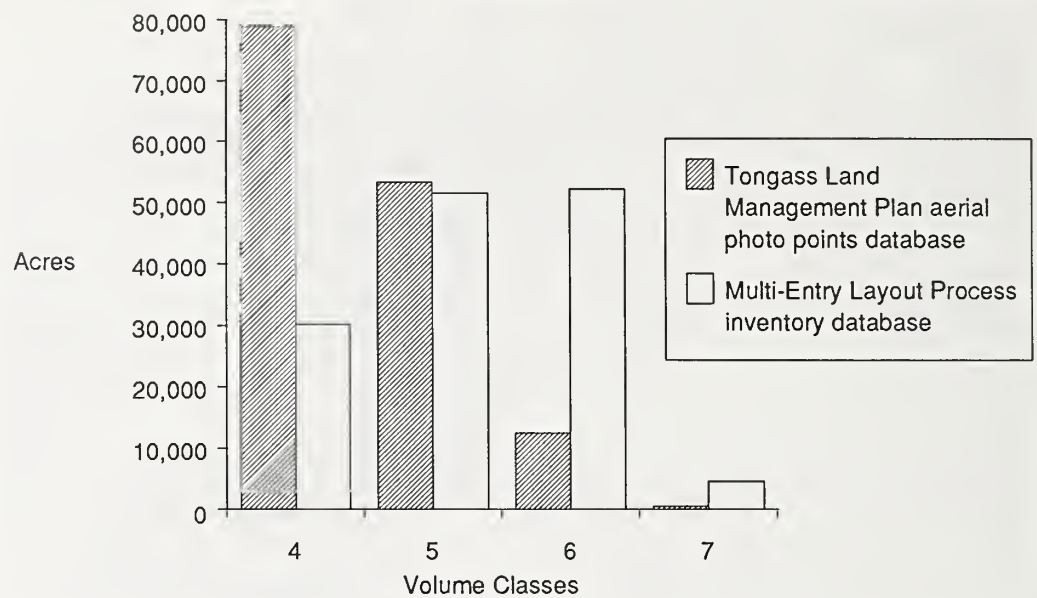


Table 3-2

## Commercial Forest Land by Volume Class in Acres

VCU	Volume Class <sup>1</sup>			
	4	5	6	7
398	1,555	2,506	1,846	364
399	2,791	7,799	5,123	76
400	4,521	6,826	4,143	430
401	3,553	3,737	1,208	0
402	2,290	6,360	7,738	398
416	2,914	4,002	5,274	1,268
417	2,501	3,313	2,238	158
418	1,121	1,726	1,807	544
419	2,054	3,262	4,325	296
420	3,028	4,632	8,835	833
421	2,138	6,669	9,842	207
427	1,687	718	112	170
428	4,969	4,607	300	40
Total	35,122	56,157	52,791	4,784
Percent of CFL <sup>2</sup>	21	37	39	3

SOURCE: Multi-Entry Layout Process database, Stikine Area Supervisor's Office, Petersburg, AK.

NOTE: MELP data not available for VCUs 405.1, 427, and 428.

<sup>1</sup> Volume Classes 1 through 3 (not presented) contain less than 8 MBF/acre; Volume Class 4 contains 8-20 MBF/acre; Volume Class 5 contains 20-30 MBF/acre; Volume Class 6 contains 30-50 MBF/acre; and Volume Class 7 contains 50 or more MBF/acre.

<sup>2</sup> Value includes volume classes 4 through 7 only.

## Timber Harvested

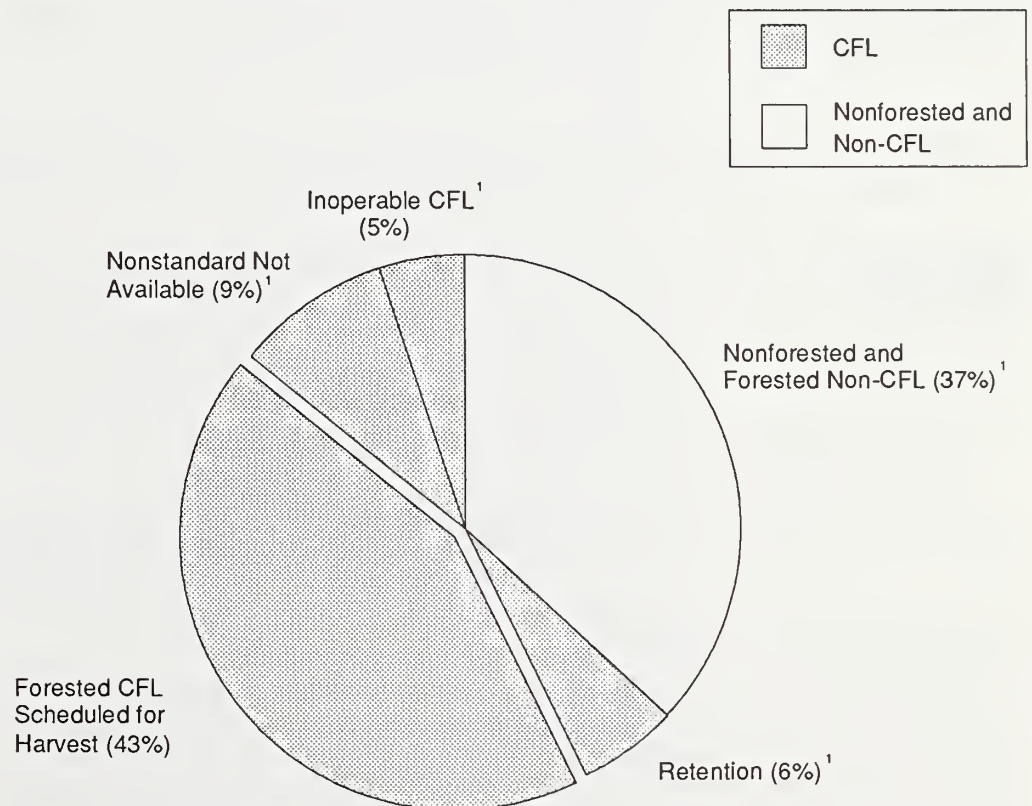
Of the 158,164 acres of combined normal and nonstandard operable CFL in TLMP, 14,268 acres have been retained from harvest for wildlife, and 1,605 acres have been removed from harvest for extended rotation. These reductions leave 142,291 acres in Analysis Area 12 (54 percent) available for harvest in this rotation (Figure 3-3).

Most of the timber harvested to date and planned for harvest in the Tongass National Forest has been from mature or overmature stands. Occasionally, second-growth stands (younger, even-aged stands that grew after removal of the previous timber stand) originating from wind or landslide disturbance are harvested. Commercially harvested species include western and mountain hemlock, Sitka spruce, western red cedar, and Alaska-cedar. Table 3-3 provides a summary of the timber acreage harvested during each five-year period and to date is based on the MELP inventory. Figure 3-4 displays the percentage of operable commercial forest land that has been harvested as of September 1, 1988.

As shown in Figure 3-4, 20 percent or more of the operable CFL has been harvested in some VCUs. It may be possible to harvest additional acreage in these VCUs, however, environmental, economic, and engineering concerns make it virtually impossible to generalize about what the intensity and timing of harvest should be in each VCU. Concern for protecting other resources, including soils, water quality, fish and wildlife habitat, and visual resources, limit the acreage that may be harvested within 20-year increments. The Alaska Regional Guide

Figure 3-3

### Percentage of Timber Land Type Scheduled for Harvest by Tongass Land Management Plan



SOURCE: Tongass Land Management Plan aerial photo points inventory, Forest Service Region 10, Juneau, AK.

<sup>1</sup> Not scheduled for harvest.

Table 3-3

## Past Timber Harvest in Acres (MELP)

VCU	Pre-1981 Harvest	1981-1986 Harvest	1986-1989 Harvest <sup>1</sup>	Total Harvest
398	516	206	494	1,261
399	2,714	198	862	3,774
400	3,335	57	381	3,773
401	0	0	0	0
402	3,058	597	780	4,435
403	250	67	0	317
405.1	0	0	0	0
416	273	0	0	273
417	457	0	0	457
418	112	0	0	112
419	331	0	169	331
420	36	0	241	129
421	2,121	1,176	1,073	4,370
427	95	0	0	95
428	0	0	0	0
Total	13,298	2,301	3,683	19,282

SOURCE: Multi-Entry Layout Process database, Stikine Area Supervisor's Office, Petersburg, AK.

<sup>1</sup> Column represents harvest as of September 1, 1988.

(Forest Service 1983) explains the Tongass National Forest management policy for these resources. Options for road locations and the need to provide economically feasible harvest units also place limitations on the amount of timber that can be harvested.

## Silvicultural Treatments

Regeneration is the process of establishing a new crop of trees on the harvested units. Beginning in 1976, regeneration has been certified by a silviculturist in the Tongass National Forest when the harvest unit is adequately stocked with healthy young trees. Regeneration certification usually occurs within three to five years after a stand has been harvested. To date, 15,692 acres of land harvested from 1976 to 1984 have been certified as being adequately stocked. Stands that were harvested between 1985 and 1988 are expected to have enough natural regeneration to be certified by 1993.

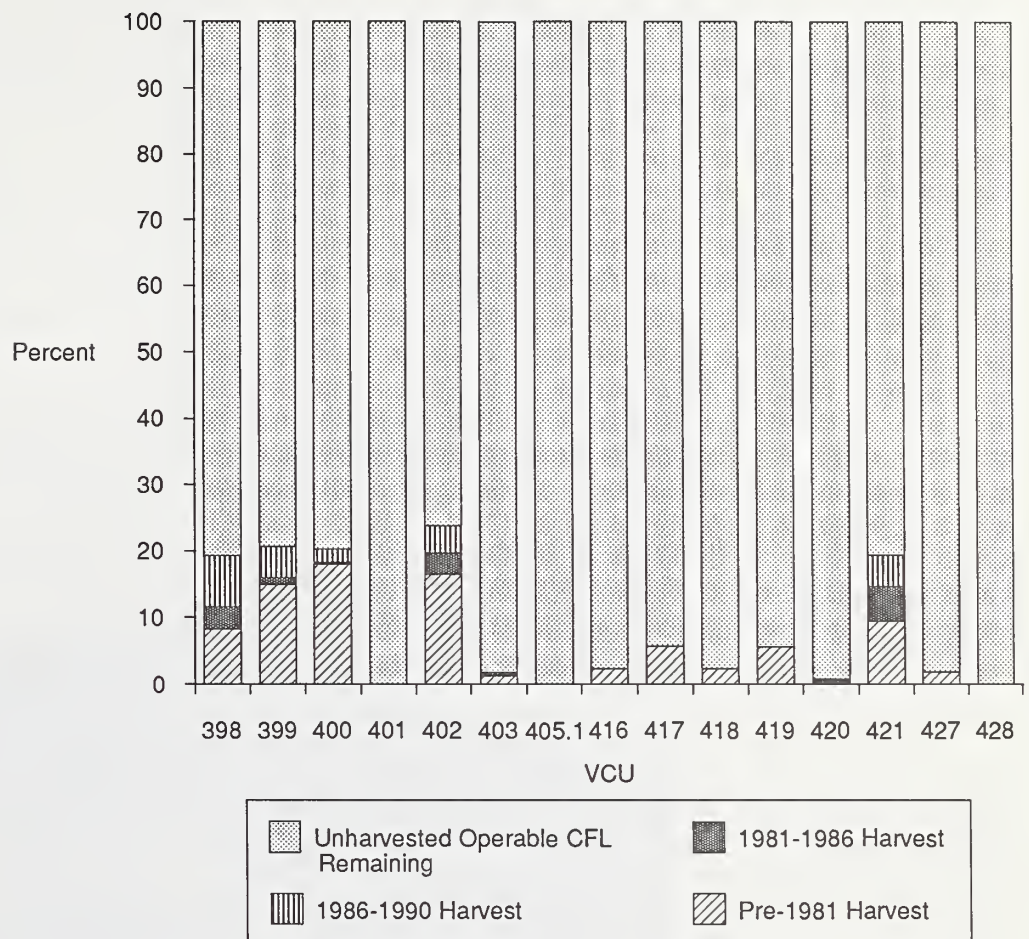
Precommercial thinning is the selective removal of trees from second-growth stands 12 to 20 years old. Thinning is conducted to reduce competition among the trees in the stand, causing the remaining trees to grow faster and larger. Precommercial thinning benefits other resources such as wildlife by allowing more light to reach the forest floor, increasing understory production.

Wildlife habitat needs are sometimes a high priority during site selection for precommercial thinning where deer winter range is important. As the number and age of second-growth stands increase, canopy closure causes a reduction in timber stand diversity and forage production. Precommercial thinning can improve deer habitat by opening up the stand, allowing more light to reach the forest floor, and maintaining forage production for 10 to 20 years longer than areas that have not been precommercially thinned. Old-growth habitat conditions will result at a younger stand age when thinning treatments are applied throughout the rotation.



Figure 3-4

**Percentage of Operable CFL Harvested as of September 1, 1988**



Source: Multi-Entry Layout Process database, Stikine Area Supervisor's Office, Petersburg, AK.

The Knutson-Vandenburg Act of 1930, as amended by the National Forest Management Act of 1976, allows the Forest Service to collect receipts from timber sales for Sale Area Improvement (SAI) activities. Top priority for these funds is to ensure stand regeneration. Subsequent projects are prioritized and listed on the SAI plan. Table 3-4 lists the acreage that has been precommercially thinned for all reasons.

The Federal District Court decision of June 24, 1987 (*Tenakee Springs v. Courtright*) resulted in a deferral of timber harvesting in certain parts of the APC Contract area. Deferred VCUs in Analysis Area 12 include 416, 417, and 418 and portions of VCUs 419 and 420 (Notice of Intent, Barton 1987). Some timber in Analysis Area 12, however, has been available to APC from nondeferred VCUs during the interim period from December 7, 1987, when preparation of the Phase I SEIS began, until an alternative is selected from the Phase II SEIS. Since preparation of the Phase I SEIS began on December 7, 1987, harvesting of timber has continued on certain nondeferred units. Table 3-5 provides the acreage of timber available to APC as of September 1, 1988 that can be harvested before the Record of Decision is filed for this SEIS.

## Timber Volume Available

Table 3-4

## Precommercial Thinning

VCU <sup>1</sup>	Acres Thinned	KV Wildlife Funded Acres <sup>2</sup>
398	467	—
399	1,821	229
400	1,336	538
402	962	90
416	185	86
417	368	368
419	314	260
421	125	—
Total	5,578	1,571

SOURCE: Petersburg Ranger District stand records, Petersburg, AK.

<sup>1</sup> VCUs 401, 403, 405, 418, 420, 427, and 428 have had no precommercial thinning.

<sup>2</sup> These acres were funded by KV Wildlife collections (Knutson-Vandenburg Act of 1930).

*Foreground is 8-12 Year Old Second Growth, Middle Ground is Aquatic Habitat Management Unit, Background is Recent Harvest*



Table 3-5

**Timber Volume Available from Nondeferred and Partially Deferred VCUs**

VCU	Timber Available 8/1/89	
	<i>Acres</i>	<i>Volume (MBF)</i>
398	0	0
399	45	1,310
400	15	437
402	44	1,280
419	564	16,412
420	96	2,794
421	0	0
Total	764	22,233

SOURCE: Petersburg Ranger District sale administration records, Petersburg, AK.

NOTE: No harvest is currently planned for VCUs 401, 403, 405.1, 427, and 428. VCUs 416, 417, and 418 have been deferred.

**Timber Harvest Modifications from APC 1981-86 ROD and APC 1986-90 ROD**

The Federal District Court decision of June 24, 1987 (*Tenakee Springs v. Courtright*) has required the Forest Service to document in this SEIS any changes in timber harvest from what was planned in the APC 1981-86 and 1986-90 RODs. In addition, the Forest Service is required to evaluate any environmental impacts resulting from such changes. The purpose of this section is to address this public concern while satisfying the above requirements.

The planning record shows that the majority of the modifications in the 38 harvest units in the 1981-86 ROD and 30 in the 1986-90 ROD were small changes that were necessary to implement the Standards and Guidelines or that would reduce the risk of environmental impact. Table 3-6 summarizes the changes in timber harvest from both the APC 1981-86 and 1986-90 RODs. Many harvest units were reduced in size or changed in configuration to prevent the need for yarding across streams, to create a buffer strip along a stream, avoid hazardous soils, to reduce visual effects, or to reduce the risk of the remaining timber blowing down. Another source of apparent modification results from the availability of more precise data on acreage

Table 3-6

**Timber Harvest Unit Modifications From the 1981-86 and 1986-90 RODs**

Planning Period	Number of Units	Deleted (acres) <sup>1</sup>	Added (acres) <sup>2</sup>	Change (acres)
1981-1986	38	-236	254	18
1986-1990	30	-205	199	-6
1981-1990 Blow-Down Salvage	15	0	452	452
Total	83	-441	905	464

SOURCE: Petersburg Ranger District sale administration records, Petersburg, AK.

<sup>1</sup> Acres planned for harvest in ROD, but not harvested.

<sup>2</sup> Acres harvested but not planned for in ROD.



and unit configuration resulting from on-site work in preparing the harvest units. These data logically supercede the planning level data generated from aerial photographs, which are necessarily used in the EIS.

There were both increases and decreases in harvest unit sizes that resulted from such adjustments in data. Other harvest units were enlarged somewhat to compensate for reduction in some units. A total of 441 acres were deleted in such actions and 905 acres were added. The changes result in a net increase of 464 acres over those cleared by the earlier RODs. The net increase is mainly explained by the addition of the 452 acres (15 harvest units) that were salvaged blow down.

In addition, two units, totaling 173 acres, that were identified in the 1986-90 ROD (Units D10 and D11) are being proposed for deletion. One of these is a planned blow-down salvage in which the wood deteriorated beyond usability, and the other is deemed too risky to harvest because of difficult access. An Environmental Assessment discussing the reasons for and the effect of proposed deletions is included in Appendix B-2 of the Phase II Draft SEIS.

Forest Service records indicate that between January 1, 1981 and September 1, 1988 approximately 5,600 acres have been harvested. This indicates a net increase in acreage of approximately 8.4 percent. This net increase in acreage is almost entirely due to the salvage of blow-down timber (8.1 percent) and is minor in terms of the total acreage approved for harvest in the APC 1981-86 and 1986-90 RODs in Analysis Area 12.

A reduction in acres of remaining old-growth habitat condition was a potential concern of unit modifications made from the RODs. The net effect of the above harvest modifications to old-growth habitat condition was an additional 38 acres of unharvested old growth habitat condition than were originally planned in the RODs (Table 3-7). Details on the units modified, their acreage, the reason for modification, and the resulting impacts are documented in Appendix A-2. No significant adverse environmental impacts resulted from the modifications to the RODs, and a number of potential environmental impacts were avoided.

## Roads

Kuiu Island contains no public transportation facilities (State highways, ferry docks, or airports) and current Southeast Alaska transportation development plans do not include any such facilities within the foreseeable future (Alaska Department of Transportation and Public Facilities 1976). The only developed community in Analysis Area 12 is the logging camp at

Table 3-7

### Timber Harvest Unit Modifications Within Old-Growth Habitat Conditions

Planning Period	Number of Units	Deleted (acres) <sup>1</sup>	Added (acres) <sup>2</sup>	Change (acres)
1981-1986	8	43	43	0
1986-1990	17	159	121	38
1981-1990 Blow-Down Salvage	1	0	8	8
Total	26	202	172	30

SOURCE: Petersburg Ranger District sale administration records, Petersburg, AK.

<sup>1</sup> Acres planned for harvest in ROD, but not harvested.

<sup>2</sup> Acres harvested but not planned for in ROD.

Table 3-8  
**Road Status in Miles**

VCU	Existing Road	Road Construction Under Contract <sup>1</sup>	1986-1990 FEIS Roads to Construct <sup>1</sup>
398	2.1	0	0
399	26.2	0	1.5
400	25.4	0	0.7
402	40.5	0	0
403	6.7	0	0
405.1	0	0	0
416	0	0	— <sup>2</sup>
417	0	0	— <sup>2</sup>
418	0	0	— <sup>2</sup>
419	2.3	8.6	— <sup>3</sup>
420	4.5	0	— <sup>3</sup>
421	34.2	0	— <sup>3</sup>
Total	141.9	8.6	2.2

SOURCE: SEIS Planning Record.

<sup>1</sup> Road construction authorized by the Alaska Federal District Court in the nondeferred VCUs.

<sup>2</sup> Deferred VCU.

<sup>3</sup> Partially deferred VCU.

Rowan Bay. Consequently, timber harvest and related National Forest management activities are the purposes of transportation development. Vehicular traffic is primarily Forest Service or APC administrative use. Historically, APC enforced a policy restricting camp residents from using their own vehicles on Kuiu Island. While that policy is no longer rigidly enforced, few privately owned vehicles are found on Kuiu Island.

Currently, there are over 140 miles of roads in Analysis Area 12 (Table 3-8). The roads are in eight VCUs in the northern part of Kuiu Island. The roads in Analysis Area 12 are part of an interconnecting system linked to the Rowan Bay Log Transfer Facility (LTF). Most of the road miles connect drainages of Rowan Bay, Security Bay, Saginaw Bay, and Kadake Creek. One stretch of road extends past the heads of the Bay of Pillars and Port Camden and along two sides of Threemile Arm.

The majority of the roads are in VCUs 399, 400, 402, and 421. Fewer road miles are in VCUs 398, 403, 419, and 420. There are no Forest Development System roads in VCUs 401, 405.1, 416, 417, 418, 427, or 428. Additional extensions of existing roads are currently under schedule for construction through the 1986-90 Operating Period (Table 3-8).

The status of other roads in this Analysis Area is as follows:

- VCUs 417 and 418--Road construction would be associated with the log transfer facility at No Name Bay if and when it is constructed.

*Logs are Unloaded at Rowan Bay Sort Yard*



## Log Transfer Facilities, Logging Camps, and Administrative Sites

There are two existing log transfer facilities and two planned in Analysis Area 12. All of the log transfer activities are currently at Rowan Bay.

The Rowan Bay LTF was originally designed and constructed in 1974 as a low-profile slide facility to skid log bundles directly into the water. The facility was reconstructed in 1975 to permit lifting of log bundles into the water. It was again reconstructed in 1988 to a low-profile ramp facility. The Rowan Bay LTF has had 349 MMBF of timber moved through it since it was constructed.

Rowan Bay is the only active logging community on Kuiu Island and has been in use since 1974. As of September 1988, there were 36 permanent residents; 40 to 50 bunkhouse employees; 38 children, of which 23 were school age; 2 full time school teachers; and 8 teacher aides. There were also seven tree thinning contractors and their families. Infrastructure at Rowan Bay includes 32 mobile homes, 6 bunkhouses with a 100-person capacity, 2 permanent maintenance shops, a cookhouse with a 40-person capacity, a business office, a laundry facility, a post office, and a public school.

Rowan Bay is primarily served by vendors and businesses from four Southeast Alaska communities. Goods and services are provided by 18 Sitka concerns, 6 Petersburg businesses, 7 Wrangell businesses, and 16 companies from Ketchikan.

The only existing Forest Service administrative site on Kuiu Island is located in Rowan Bay. The administration site consists of six trailer houses for crew quarters, a cook shack, and a warehouse. This site can accommodate approximately 30 forest workers.

The Saginaw Bay LTF is functional, but not currently being used. It was initially a bundle skid facility built in 1964. It was reconstructed to a lift off system in 1986. The permits for it are valid until June 1991. Since its construction, 174 MMBF of timber have been moved through the Saginaw Bay LTF. Saginaw Bay originally had a logging camp associated with it, but the camp was disassembled and no plans exist for its reconstruction. During the last week



of November 1988 a storm swept through Southeast Alaska with heavy rainfall resulting in numerous landslides and stream flooding events. North Kuiu Island was particularly hard hit by this storm. A massive landslide occurred just east of the Saginaw LTF, which obliterated the road to the log transfer facility and abandoned logging camp site. Evaluations are currently underway to assess the cost-effectiveness of removing the slide and repairing the roadway.

Alternatives considered in the 1986-90 FEIS scheduled the use of log transfer facilities at Rowan Bay, Saginaw Bay, and No Name Bay within Analysis Area 12. A log transfer facility does not currently exist at No Name Bay. The No Name Bay LTF would be required to economically harvest timber in VCUs 416, 417, and 418. No Name Bay was selected as the location for a log transfer facility in the 1981-86 ROD, but the specific location and design for the facility was analyzed after the 1981-86 EIS effort. The environmental analysis for it was disclosed in the Environmental Assessment for the TTF and Camp Location for Timber Harvest Scheduled from East Kuiu Island (Appendix B-1, Phase II Draft SEIS). Nine alternatives for the log transfer facility were considered in the analysis including an alternative that would not construct the LTF at No Name Bay, but would haul all timber to the existing Rowan Bay LTF. Forest Supervisor Robert E. Lynn published a decision to construct the log transfer facility in a prescribed area adjacent to No Name Bay on April 15, 1987. The selected alternative would involve construction of an LTF on the small island at the mouth of No Name Bay (Site 4) and a logging camp near saltwater on the south side of No Name Bay (Site C). The log transfer facility would be of the low-angled slide design. Supervisor Lynn's decision was appealed by the Sumner Strait Fish and Game Advisory Committee, the Southeast Alaska Conservation Council (SEACC), and the Alaska Society of American Forestdwellers on June 1, 1987. Subsequent to the appeal, the Regional Forester issued a Notice of Intent to prepare this Supplement to the Environmental Impact Statements associated with the 1981-86 and 1986-90 Operating Periods to address issues identified in Civil Case J86-024 (*Tenakee Springs v. Courtright*).

On January 25, 1988, Acting Forest Supervisor Douglas K. Barber made the decision to withdraw Forest Supervisor Robert E. Lynn's decision to construct a log transfer facility and associated logging camp at No Name Bay. On February 11, 1988, Regional Forester Michael A. Barton concurred with Acting Supervisor Barber's decision to withdraw Supervisor Lynn's decision and, thereby, dismissed the appeals of the decision to construct the log transfer facility and logging camp.

## Wildlife

Alaska's fish and wildlife are valuable for aesthetic, economic, recreational, and subsistence purposes. Visitors come from all over the world to view bald eagles, spawning salmon, mountain goats, and other wildlife species in Southeast Alaska. Over 300 species of birds, fish, and mammals occur in the Tongass National Forest.

Many wildlife species exist within the Contract area and occupy a diverse range of habitats. However, not all the species that occur in the Contract area will be affected by the proposed actions or alternatives. Therefore, to identify effects on wildlife, several types of studies and inventories have been conducted.

Wildlife habitats were identified in the analysis area. Habitat refers to the kind of environment in which a species occurs. This environment can be described in physical or biological terms, which often includes elevation, topographic position, or type of vegetation community. A species may occupy a range of different habitats, or more than one distinctive kind of habitat in different seasons. Habitats identified in previous forest management plans and used in this document include: old growth, forested, deer winter range, inland wetland, beach



Grouse

fringe, estuarine fringe, and streamside riparian. An acreage inventory of each habitat by VCU is included below in the Emphasis Habitats section. Maps of these habitat types are available in the Planning Record.

Several wildlife species that use those habitats were identified for additional evaluation. These animals were named emphasis species due to their importance in the overall area, both to the ecosystem and humans. The emphasis species selected for this analysis were identified during development of the 1986-90 APC Contract area plan. The species selected include: Sitka black-tailed deer, black bear, pine marten, land otter, bald eagle, and Vancouver Canada goose.

Information obtained from the habitat inventory, literature review, and resource agency records provided the basis for an emphasis species evaluation. The Sitka black-tailed deer and pine marten evaluations included use of a habitat capability model. The models use biological and habitat information unique for each species to estimate the capability of a given habitat to support a population. Information provided by each model allows land managers and resource agency personnel to evaluate existing habitat capabilities and predict the relative effects of a proposed land management activity.

## Wildlife Habitats

Several types of wildlife habitat (the Emphasis Habitats) were inventoried and analyzed in the APC 1981-86 and 1986-90 FEISs. Since preparation of those management plans, more specific information has been obtained for Analysis Area 12. The additional inventory data and a discussion follow in the Emphasis Habitats section. Two noninventoried habitats discussed in the FEISs include alpine/subalpine and old growth.

Subalpine habitat is the upper edge of forested areas (within 1,000 feet) adjoining alpine areas. This habitat is important summer range for deer and bear. Alpine/subalpine habitat is not included in this analysis because timber is not harvested there, and it would be essentially unaffected during the 1986-90 Operating Period.

Certain wildlife such as Sitka black-tailed deer are reported to be old-growth dependent species. Therefore, to recognize its importance, old-growth habitat was introduced in the 1986-90 FEIS as a management prescription. Further discussion of old-growth habitat characteristics is included below. The prescribed management acreage and effects of the proposed harvest alternatives can be found in Chapter 4.

Forested habitat includes all areas with forest cover and has not been identified as an emphasis habitat. All other habitats evaluated in this EIS are located within the forested habitat. Many wildlife species, including those dependent on old growth, make use of all forested areas within the study area. Therefore, while the other habitats have been delineated because of specific attributes or management concerns, the forested habitat is presented to disclose general overall effects on carrying capacity for old-growth dependent species (Forest Service 1986b, pp. 3-22 and 3-23).

### Emphasis Habitats

Emphasis habitats inventoried since the Tongass Land Management Plan for Analysis Area 12 include deer winter range, inland wetland, beach fringe, estuarine fringe, and streamside riparian. The inventory was predominantly obtained from mylar maps developed during the analysis for the EIS for the 1986-90 Operating Period. Mylar maps were prepared with the help of topographical maps and aerial photos. Ground verification of some of the habitats resulted in revision of the habitat maps.

Tongass Land Management Plan data were used for VCUs 398, 401, and 403 because wildlife inventories were not completed for the 1986-90 FEIS analysis and no timber harvest was planned for these VCUs. The Tongass Land Management Plan data were collected in a similar, but not identical, manner as the 1986-90 FEIS inventories and are used where 1986-90 FEIS inventory data are not available.



Table 3-9 lists the estimated amount of wildlife habitat prior to any timber harvest. If the 1986-90 habitat mylars indicated a particular habitat (for example, deer winter range) is present on either side of an existing clearcut unit, the acreage of the clearcut unit was assumed to have been deer winter range and added into the total for deer winter range presented in the table. The data in Table 3-9 are used as a baseline for calculating the amount of habitat converted to second-growth timber management. It is important to recognize that when trees are harvested from an area, a habitat still exists, however its value is changed.

Table 3-10 shows the amount of wildlife habitats that have been harvested as of September 1, 1988. This includes logging that occurred under the Long-Term Timber Sale Contract and earlier clearcut logging that has occurred primarily since the 1950s, although some harvesting took place as early as 1918. Generally, less than 10 percent of the habitats have been harvested. Notable exceptions include VCUs 402 and 400 where 28 percent and 19 percent of the deer winter range has been harvested. Fifteen percent of the deer winter range has also been harvested in VCUs 399 and 421. Fifteen percent, 12 percent, and 13 percent of the beach fringe habitat from VCUs 419, 417, and 421, respectively, have also been harvested. Of the forested habitat, which includes all the commercial forest land, 25 percent, 18 percent, 17 percent, 22 percent, and 20 percent, have been harvested in VCUs 398, 399, 400, 402, and 421, respectively.

Table 3-9

**Existing Acres of Wildlife Habitat Prior to Recorded Timber Harvest**

VCU	Forested <sup>2</sup>	Deer Winter Range	Inland Wetland	Beach Fringe	Estuarine Fringe	Steamside Riparian
398 <sup>1</sup>	4,957	2,762	0	2,125	0	0 <sup>3</sup>
399	20,711	2,720	1,804	1,630	1,930	115
400	22,070	14,190	708	2,060	2,870	144
401 <sup>1</sup>	8,213	5,846	0	2,088	0	0 <sup>3</sup>
402	20,099	4,490	744	1,370	1,420	392
403 <sup>1</sup>	18,239	12,761	3,351	1,676	0	67 <sup>3</sup>
405.1	1,056 <sup>4</sup>	64	160	0	0	112
416	13,676	5,320	720	2,190	80	488
417	9,125	4,720	1,340	1,930	0	0
418	6,648	2,190	1,150	620	1,170	96
419	10,865	3,560	1,120	1,530	2,400	160
420	15,828	6,790	2,940	2,870	4,780	64
421	22,034	2,330	2,000	840	1,570	69
427	2,175	1,350	0	975	0	0 <sup>3</sup>
428	9,357	9,200	0	1,414	157	0 <sup>3</sup>
<b>Total</b>	<b>185,053</b>	<b>78,293</b>	<b>16,037</b>	<b>23,318</b>	<b>16,377</b>	<b>1,707</b>

SOURCE: 1986-90 FEIS (Forest Service 1986b) with revisions from additional ground verification (SEIS Planning Record).

<sup>1</sup> Tongass Land Management Plan data is used since subsequent wildlife inventories have not been completed for the VCUs that are not scheduled for timber harvest. The Tongass Land Management Plan data were collected in a similar manner as the subsequent wildlife inventory data.

<sup>2</sup> Commercial forest land from the Tongass Land Management Plan land-type timber data.

<sup>3</sup> Tongass Land Management Plan data did not identify this habitat as a separate resource code. These acreages were developed using a planimeter and mylar overlay on a scale of two inches per mile.

<sup>4</sup> Acreage from Table 4-26, 1986-90 FEIS.



Table 3-10

## Wildlife Habitats Harvested through September 1, 1988

VCU	Forested	Deer Winter Range	Inland Wetland	Beach Fringe	Estuarine Fringe	Streamside Riparian
<i>Acres</i>						
398	1,216	0	— <sup>1</sup>	64	— <sup>1</sup>	— <sup>1</sup>
399	3,774	419	90	140	16	0
400	3,773	2,747	48	176	0	0
401	0	0	— <sup>1</sup>	0	— <sup>1</sup>	— <sup>1</sup>
402	4,435	1,292	64	92	0	8
403	317	0	0	3	— <sup>1</sup>	0
405.1	0	0	0	— <sup>1</sup>	— <sup>1</sup>	0
416	273	184	0	112	8	16
417	457	352	0	228	— <sup>1</sup>	— <sup>1</sup>
418	112	56	40	29	0	4
419	331	328	0	235	0	0
420	129	0	0	0	64	0
421	4,370	360	200	107	24	0
427	95	0	— <sup>1</sup>	0	— <sup>1</sup>	— <sup>1</sup>
428	0	0	— <sup>1</sup>	0	0	— <sup>1</sup>
Total	19,282	5,866	442	1,186	112	28
<i>Percent</i>						
398	25	0	— <sup>1</sup>	3	— <sup>1</sup>	— <sup>1</sup>
399	18	15	5	9	1	0
400	17	19	7	9	0	0
401	0	0	— <sup>1</sup>	0	— <sup>1</sup>	— <sup>1</sup>
402	22	28	9	7	0	2
403	2	0	0	— <sup>2</sup>	— <sup>1</sup>	0
405.1	0	0	0	— <sup>1</sup>	— <sup>1</sup>	0
416	2	3	0	5	10	3
417	5	7	0	12	— <sup>1</sup>	— <sup>1</sup>
418	2	3	3	5	0	4
419	3	9	0	15	0	0
420	1	0	0	0	1	0
421	20	15	10	13	2	0
427	4	0	— <sup>1</sup>	0	— <sup>1</sup>	— <sup>1</sup>
428	0	0	— <sup>1</sup>	0	0	— <sup>1</sup>
Total <sup>3</sup>	10	7	3	5	1	2

SOURCE: 1986-90 FEIS (Forest Service 1986b) with revisions from additional ground verification (SEIS Planning Record).

<sup>1</sup> None of this habitat was found in the inventory.

<sup>2</sup> Harvested amount is less than one percent.

<sup>3</sup> This value represents the percent of pre-harvest habitat affected in the entire analysis area.

Some timber within wildlife use areas is authorized for harvest between September 1, 1988 and the December 31, 1990. As shown in Table 3-11, the acreage figures and percentages are generally low. The exception includes VCU 419 where 7 percent of the deer winter range, estuarine fringe, and forested habitats would be logged.

Table 3-12 shows the acreage and percentage of each habitat that would remain following Court-authorized harvest activities through December 31, 1990. In all cases, at least 70 percent of the habitats would remain, and in most cases more than 80 percent would remain in each VCU. The percent of habitats remaining by 1990 reflects only authorized harvest activities and does not include the proposed actions described in Chapter 2 of this document.

#### Deer Winter Range

The limiting factor for Sitka black-tailed deer carrying capacity is deer winter range. The attributes of low-elevation old-growth stands that constitute deer winter range have been documented by Wallmo and Schoen (1980). Those attributes include proper canopy cover, understory, slope, aspect, distance to saltwater, and elevation. Though an array of habitat choices is available in Southeast Alaska, these habitats vary in their ability to meet the changing seasonal requirements of the deer. During the summer and early fall, deer in Southeast Alaska use habitats that include clearcuts, alpine, and low- and high-volume old-growth

Table 3-11  
**Anticipated Harvest of Wildlife Habitats<sup>1</sup>**

VCU	Forested	Deer Winter Range	Inland Wetland	Beach Fringe	Estuarine Fringe	Streamside Riparian
<i>Acre</i>						
399	58	0	0	0	0	0
400	164	176	16	0	0	0
402	78	0	0	0	0	0
419	746	243	0	55	176	3
420	210	162	0	24	16	0
421	131	0	16	0	0	0
Total	1,387	581	32	79	192	3
<i>Percent</i>						
399	— <sup>2</sup>	0	0	0	0	0
400	1	1	2	0	0	0
402	— <sup>2</sup>	0	0	0	0	0
419	7	7	0	4	7	2
420	1	2	0	1	— <sup>2</sup>	0
421	1	0	1	0	0	0
Total <sup>3</sup>	1	1	— <sup>2</sup>	— <sup>2</sup>	1	— <sup>2</sup>

Source: 1986-90 FEIS (Forest Service 1986b) with revisions from additional ground verification (SEIS Planning Record).

<sup>1</sup> Harvest planned from September 1, 1988 to the end of the 1989 harvest season, cleared under the ROD for the 1986-1990 FEIS; this only includes timber harvest units authorized by the Court, not units in the deferred VCUs.

<sup>2</sup> Anticipated harvest is less than one percent.

<sup>3</sup> This value represents the percent of pre-harvest habitat affected in the entire analysis area.

Table 3-12

## Wildlife Habitats Remaining After 1986-1990 Authorized Timber Harvest

VCU	Forested	Deer Winter Range	Inland Wetland	Beach Fringe	Estuarine Fringe	Streamside Riparian
<i>Acres Remaining</i>						
398	3,741	2,762	— <sup>1</sup>	2,061	— <sup>1</sup>	— <sup>1</sup>
399	16,879	2,301	1,714	1,490	1,914	115
400	18,133	11,267	644	1,884	2,870	144
401	8,213	5,846	— <sup>1</sup>	2,088	— <sup>1</sup>	— <sup>1</sup>
402	15,586	3,198	680	1,278	1,420	384
403	17,922	12,761	3,351	1,673	— <sup>1</sup>	67
405.1	1,056	64	160	— <sup>1</sup>	— <sup>1</sup>	112
416	13,403	5,136	720	2,078	72	472
417	8,668	4,368	1,340	1,702	— <sup>1</sup>	— <sup>1</sup>
418	6,536	2,134	1,110	591	1,170	92
419	9,788	2,989	1,120	1,240	2,224	157
420	15,489	6,628	2,940	2,846	4,700	64
421	17,533	1,970	1,784	733	1,546	69
427	2,080	1,350	— <sup>1</sup>	975	— <sup>1</sup>	— <sup>1</sup>
428	9,357	9,200	— <sup>1</sup>	1,414	157	— <sup>1</sup>
Total	164,384	71,974	15,563	22,053	16,073	1,676
<i>Percent Remaining</i>						
398	75	100	— <sup>1</sup>	97	— <sup>1</sup>	— <sup>1</sup>
399	82	85	95	91	99	100
400	82	79	91	91	100	100
401	100	100	— <sup>1</sup>	100	— <sup>1</sup>	— <sup>1</sup>
402	78	71	91	93	100	98
403	98	100	100	99	— <sup>1</sup>	100
405.1	100	100	100	— <sup>1</sup>	— <sup>1</sup>	100
416	98	97	100	95	90	97
417	95	93	100	85	— <sup>1</sup>	— <sup>1</sup>
418	98	97	97	95	100	96
419	90	84	100	81	93	98
420	98	98	100	99	98	100
421	80	85	89	87	98	100
427	96	100	— <sup>1</sup>	100	— <sup>1</sup>	— <sup>1</sup>
428	100	100	— <sup>1</sup>	100	100	— <sup>1</sup>
Total <sup>2</sup>	89	92	97	95	98	98

SOURCE: 1986-90 FEIS (Forest Service 1986b) with revisions from additional ground verification (SEIS Planning Record).

<sup>1</sup> None of this habitat was found in the inventory.

<sup>2</sup> This value represents the percent of pre-harvest habitat remaining in the entire analysis area.





forest. Throughout winter and early spring, however, deer use old growth almost exclusively (Schoen et al. 1985). Schoen further indicates that during winters with deep snow, deer prefer high-volume old growth over all other habitats.

A study conducted on Vancouver Island (McNay and Doyle 1987) indicated that black-tailed deer habitat use varied depending on seasonal movement behavior. Conclusions reached in this study might apply to Southeast Alaska, because habitats on Vancouver Island are representative of a coastal environment. Radio-collared deer were studied over five years to identify seasonal movement strategies and winter habitat selection. Movement strategies were divided into migrators and nonmigrators (residents). Seasonal home ranges of migratory deer were found to be significantly larger than those of resident deer and they tended to use all habitat types within their respective home ranges. Most resident deer were found to use only the pole-sapling habitats within the Douglas-fir conifer type.

McNay and Doyle (1987) also found that habitat use during specific winter weather conditions varied depending on weather severity. During heavy snow accumulation and cold temperatures most deer reduced their home range size and were forced to seek out the closest forested habitat. Home range sizes became more variable and most deer tended to prefer early successional habitats during mild weather. Both migrating and resident deer used all habitats available to them within the boundaries of their seasonal home ranges. Individual deer appeared to be relatively inflexible in their responses to habitat changes, resident deer being the least capable of dealing with catastrophe. Because migrating deer use a greater diversity of habitats within a larger home range, they appeared to be more capable of dealing with extreme conditions. It is arguable that the McNay and Doyle (1987) findings, in total or in part, have direct applicability to the Kuiu Island environment.

Deer winter range is essential to deer under severe or moderately severe winter conditions. Severe winters are described as sea level snow accumulations exceeding 30 centimeters (11.8 inches) for four or more months (Hanley, et. al. 1984). In severe winters, deer are confined to winter range habitat where it is available, or are forced to the beach fringe. Their movements are then restrained by deep and persistent snowpack; food plants become harder to obtain and available plants are overbrowsed; and in some years, large numbers of deer die (Forest Service 1986b, p. 3-21).

Moderately severe winters are those where snow accumulations range from 10 to 30 centimeters (3.9 to 11.8 inches) for four or more months. In moderately severe winters, deer require the use of winter range habitat, but most of the time they can move about within the habitat area. Sufficient food plants are available for all or most of the deer to survive. Under moderately severe winter conditions, habitat quality and abundance are the key to survival for deer (Forest Service 1986b, p. 3-21).

There have been three severe and two moderately severe winters since 1969. The three severe winters were between 1969 and 1973 and were considered to be the cause of the major deer population declines throughout Southeast Alaska. Relatively mild winters since then have allowed most deer populations throughout the APC Contract area to rebound to previous high levels. Some areas (notably Kuiu Island) are slow to repopulate with deer, primarily due to predation (Forest Service 1986b, p. 3-21).

In 1982, the Forest Service appointed an internal Task Force to define habitat that is considered Sitka black-tailed deer winter range. The Task Force included individuals from the Wildlife, Watershed, and Timber Management Departments. Further input from Alaska Department of Fish and Game along with several research papers provided the basis for a procedure to identify and inventory those habitats (Schoen 1978, Schoen, et al. 1979, 1981, Forest Service 1986f). The final delineation and ranking of deer winter range was based on both vegetation and physical parameters. Physical parameters included elevation and distance from saltwater. Vegetation parameters in two categories included stand type that influenced snow interception and stand type relating to forage needs.

Table 3-12 indicates that planned timber harvest activities authorized through December 31, 1990 will have no impact on a high percentage of deer winter range in most VCUs. The percentage of remaining habitat spans from a low of 71 percent in VCU 402 to 100 percent in six VCUs. Four of the VCUs will have greater than 95 percent remaining deer winter range. Approximately 78,000 acres of deer winter range existed prior to any recorded harvest activities. Of that, approximately 72,000 acres or 92 percent will not be impacted by harvest activities scheduled through December 31, 1990.

## Inland Wetland

These areas are not necessarily wetlands as defined by the US Fish and Wildlife Service (Cowardin, et al. 1979). Rather, inland wetland habitat is defined as forested areas within 500 feet of low elevation lakes, beaver ponds, marshlands, and associated grass/sedge meadows that are larger than 10 acres. These sites are especially important for bears, furbearers, certain waterfowl, and a variety of other wildlife. Areas inventoried for the inland wetland habitat did not include many small wetland areas that account for much of the existing wetlands.

Only minor amounts of timber harvest are scheduled for the inland wetland habitat types. Table 3-9 indicates approximately 16,000 acres of inland wetland habitat existed in Analysis Area 12 prior to any recorded timber harvest. Of that total, approximately 15,600 acres or 97 percent will remain unaffected by harvest activities scheduled through December 31, 1990 (Table 3-12).

## Beach Fringe

Forested areas within 600 feet of the ocean are transition zones between land and water, salt and freshwater, and vegetated and nonvegetated conditions (Forest Service 1979b). Forested areas in this transition zone receive heavy use by species with high economic, recreational, subsistence, or aesthetic values. Black bear, river otter, bald eagle, pine marten, black-tailed deer, and Vancouver Canada goose are typical species that concentrate their activities during some or all seasons in these forest stands. Many of these species exhibit a preference for, or dependence on, mature/overmature forest stands.

Table 3-9 indicates approximately 23,300 acres of beach fringe habitat existed in Analysis Area 12 prior to any recorded timber harvest. Of that total, approximately 22,100 acres or 95 percent will remain unaffected by harvest activities scheduled through December 31, 1990 (Table 3-12).

## Estuarine Fringe

Bears, waterfowl, furbearers, and eagles are all primary users of the estuarine fringe habitat. Although timber harvest activities have been minimal within the actual estuarine habitat, it is the timbered zone bordering estuarine habitat that is evaluated here. A 1,000-foot timbered zone around estuarine areas was identified in the Tongass Land Management Plan Wildlife Task Force Working Report (Forest Service 1979b) and was used in the 1986-90 FEIS (Forest Service 1986b, p. 3-22) to quantify alteration of habitat. The forested estuarine fringe is similar to beach fringe, but due to species diversity it has a greater value to wildlife; especially black bears, river otters, and waterfowl.

Table 3-9 indicates approximately 16,400 acres of estuarine fringe habitat existed in Analysis Area 12 prior to any recorded timber harvest. Of that total, approximately 16,100 acres, or 98 percent, will remain unaffected by harvest activities scheduled through December 31, 1990 (Table 3-12).

## Streamside Riparian

Forested areas within 500 feet of anadromous salmon spawning areas, as recommended in the Tongass Land Management Plan Wildlife Task Force Working Report (Forest Service 1979b), are called streamside riparian habitat zones. These areas are used primarily by eagles, furbearers, and black bears (Forest Service 1986b, p. 3-22).



*Beach Fringe and Estuarine  
Habitat*



*Historic Photo of Overmature  
Hemlock Forest*



Table 3-9 indicates approximately 1,700 acres of streamside riparian habitat existed in Analysis Area 12 prior to any recorded timber harvest. Of that total, approximately 1,680 acres, or 98 percent, will remain unaffected by harvest activities scheduled through December 31, 1990 (Table 3-12).

### **Old-Growth Forest**

Much of the forest in Analysis Area 12 can be considered old growth since it has been largely unaffected by timber harvest or fires. This habitat type is characterized as stands of trees usually well past the age of maturity, with declining growth rates and signs of decadence, such as dead and dying trees, snags, and downed woody material. The stand usually includes large diameter trees, multi-layered canopies, a range of tree diameter sizes, and the notable presence of understory vegetation. These forests are in a dynamic, steady-state where the death of old trees is balanced by the growth of new trees.

Old-growth forests have broken, multilayered canopies through which sunlight penetrates to the forest floor. The forest floor is typically carpeted by an abundance of ferns, mosses, herbs, and shrubs. Lichens and fungi add to the diversity, as do standing snags and decaying logs, both on the ground and in streams. Seedlings, saplings, and pole-sized trees grow in the scattered openings that are created as large old trees die and fall to the forest floor. Trees of all ages occur in such stands, and the ages of dominant trees exceed 300 years. In some stands the oldest trees are more than 800 years old, 3 meters in diameter, and 60 meters in height.

The No-Action Alternative map included with this document shows the location of habitat important to old-growth dependent species. The maps do not display all old-growth habitat, nor do they display all wildlife habitats that occur in the study area. Old-growth habitat was mapped in conjunction with deer winter range, around concentrations of eagle nest trees, and near the mouths of streams. These areas include most deer winter range and estuarine fringe, along with some beach fringe.



Old-growth habitat was not inventoried for the Tongass Land Management Plan, but was addressed by prescription in the 1986-90 FEIS. Units to be managed for old growth habitat conditions were located where no harvest or related activities would be applied during the 1986-90 Operating Period. The “no harvest” prescription will remain in effect in these areas unless the stated management direction is modified after further environmental analysis and public disclosure. Prescribed acreages for old-growth conditions as identified in the Phase I SEIS are shown in Table 4-12 (Chapter 4) along with the proposed harvest alternatives.

## Wildlife Species

In addition to identifying wildlife habitats, specific animals known as emphasis species were selected for further evaluation. A species can be termed as an emphasis species for a variety of reasons. They may be threatened or endangered animals identified on state or federal lists. They may also include species commonly hunted, fished or trapped, or nongame species of special interest. Additionally, they usually include species that may be affected by the planned management programs under consideration. The discussion and analysis of each emphasis species includes a general description and, where available, information on harvest activities and habitat capability.

The human use of wildlife emphasizes many of the prominent reasons why certain wildlife species are important. Records of human use, maintained as tools for managing populations, may also provide information on population trends that can be useful in analyzing impacts of various actions. Most of these statistics are also important in describing and evaluating subsistence issues and recreational issues.

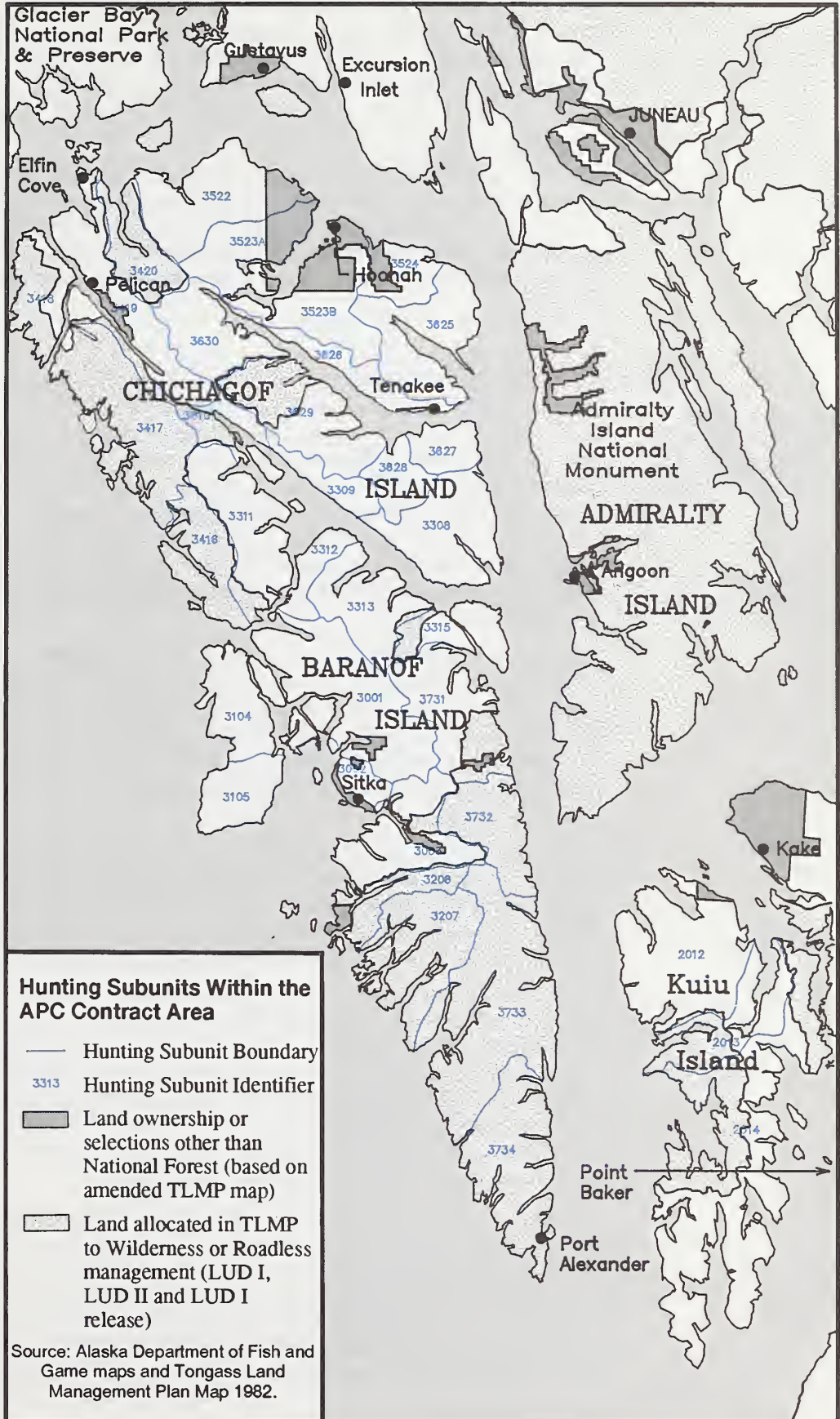
The Alaska Department of Fish and Game subdivides all land areas into Game Management Units. These boundaries provide the basis for managing the various wildlife populations under their jurisdiction. Much of the data collection concerning population density estimates originates from hunting permits and inventory work associated with the Game Management Units. Each Game Management Unit is further subdivided into Major Harvest Areas and Minor Harvest Areas.

Figure 3-5 shows that Analysis Area 12 is located in Major Harvest Area 20. Within Major Harvest Area 20 there are three Minor Harvest Areas (2012, 2013, and 2014) that include Analysis Area 12. Information provided below on emphasis species harvest is labeled by respective Major and Minor Harvest Areas. For additional information, the reader is referred to the Subsistence and Recreation sections of this EIS.

Information obtained from the habitat inventory and the biology of the emphasis species is worked into a habitat capability model. Habitat capability models are used to assist in the evaluation of effects of proposed land management activities on wildlife habitats and populations. The objective of each model is to estimate the capability of habitats in the study area to support populations of the selected emphasis species. Data collection on factors such as snow conditions, timber volume classes, physiographic features, predation, and clearcut size provide the values used to evaluate habitat capability. Species models were used to evaluate habitat capability for the Sitka black-tailed deer and pine marten (Forest Service 1988d, 1989a). The information obtained from those models is provided below under the respective emphasis species.

The development of a species model involves an extensive process of biological and literature research by a team of recognized experts. Team members are selected from a variety of sources including the Alaska Department of Fish and Game, Forest Service, US Fish and Wildlife Service, and land management agencies. After a draft model is prepared, it is thoroughly reviewed by fish and wildlife agency biologists. The model review and verification process allows a consensus among the various interests and lends credibility for its use as a management tool.

Figure 3-5





It is important to note that these models are used as a tool for management decisions. They should be recognized as only one of several sources in the overall process to identify specific project effects. Knowledge concerning each species and their various habitat needs improves through time and adds to the reliability of modeling predictions.

## Emphasis Species

The study of emphasis species is done to determine the effects of resource management activities on these important species and their habitats. Also, because the selected species may be an indicator for the viability of a particular habitat, information is gained for the other animals that use the same habitat. The degree to which predicted impacts for these species can be extrapolated to a larger segment of the wildlife community depends on careful species selection.

### Sitka Black-tailed Deer



*Sitka Black-tailed Deer*

The Sitka black-tailed deer of Southeast Alaska are more abundant on coastal islands than on the mainland (Wallmo and Schoen 1980). The Sitka black-tailed deer ranges through all major habitats in the APC Contract area. They rely heavily on forested habitats for cover, and much of their feeding is in forested areas. In summer, these deer range through all elevations, including alpine meadows and subalpine forests. They also feed in clearcuts where forage is plentiful. Winter snows drive them to lower elevations, and deep snow forces them to the beach fringe (Forest Service 1986b, p. 3-21). They may even feed on seaweed at low tide when most of their preferred browse is unavailable. They are prized for recreational and subsistence hunting in Southeast Alaska, however, no deer hunting has been permitted on Kuiu Island since 1976.

Black-tailed deer consume nearly 60 species of plants throughout their geographic range (Forest Service 1986a). The preferred winter forage of Sitka black-tailed deer is succulent evergreen shrubs and forbs, including bunchberry dogwood, five-leaved bramble, gold thread, foamflower, and pyrola (Schoen and Wallmo 1979). As snow accumulates at high elevations and covers these preferred forage species, deer will move downslope. When these preferred plants are covered with snow throughout the deer winter range, they rely primarily on various huckleberry shrubs.

Arboreal lichens are also a preferred winter food in overmature forests. The presence or absence of lichens in the diet of deer apparently reflects availability. Lichens provide large amounts of energy and may enhance the digestibility of other food items (Rochelle 1980). Lichens are a particularly important source of energy for deer during intermediate to heavy snow winters because they are available as litterfall on top of the snow.

The value of habitat for deer, under varying weather conditions, is directly related to the composition, structure, and productivity of vegetation on a site (Harestad 1985). During low snow conditions, when habitat selection by deer is not significantly influenced by snow, deer will select those habitats that provide the best foraging opportunities. Under intermediate and deep snow conditions, deer will select those habitats that provide for snow interception and food availability. The combination of a dense canopy with scattered openings in old-growth forests allows forage growth under openings while the canopy modifies snowfall sufficiently to promote forage availability and movement of deer.

A habitat capability model (Consolidated Appendix, Volume III, E-1) was used to estimate the number of Sitka black-tailed deer that could be sustained in Analysis Area 12, based on the projected deer habitat capability (Table 3-13). Several factors were considered including the type of forested lands, elevation, snow depth, and predation. Forested lands were calculated from the timber layer of a Geographic Information System database used during revision of the Tongass Land Management Plan. These lands included clearcuts from 0 to 25 years in age, second-growth timber, noncommercial forest, and commercial forest of low volume (8 to



20 MBF/acre), mid volume (20 to 30 MBF/acre), and high volume (30+ MBF/acre). Habitat use estimates were calculated for elevations both below and above 800 feet. Snow depths were based on the number of days with greater than 12 inches on the ground and mean annual snowfall. Snow depth categories included low (0 to 20 inches), medium (20 to 80 inches), and high (80 to 160 inches). Finally, a 30 percent reduction in deer numbers was included for predation by the timber wolf and black bear.

The estimated deer numbers in Table 3-13 include information on carrying capacity at the start of the APC Contract (1961) and the present condition. The table shows that Analysis Area 12 on Kuiu Island could potentially carry approximately 10,300 deer in 1961. Estimates to 1990 indicate that same area could carry approximately 9,400 deer, which represents a 8.5 percent reduction since 1961.

Table 3-13

**Estimated Deer Numbers Based on a Sitka Black-tailed Deer Habitat Capability Model**

VCU	Pre-APC 1961	1990	Percent Change
<i>Minor Harvest Area 2012</i>			
398	379	337	11.1
399	1,319	1,226	7.1
400	830	735	11.5
401	572	572	0
402	1,593	1,452	8.9
421	857	755	11.9
Subtotal	5,550	5,077	8.5 <sup>1</sup>
<i>Minor Harvest Area 2013</i>			
403	858	858	0
420	1,011	670	33.7
Subtotal	1,869	1,528	18.3 <sup>1</sup>
<i>Minor Harvest Area 2014</i>			
416	1,277	1,264	1.0
417	433	418	3.5
418	211	209	1.0
419	359	332	7.5
427	144	144	0
428	409	409	0
Subtotal	2,833	2,776	2.0 <sup>1</sup>
Total	10,252	9,381	8.5 <sup>2</sup>

SOURCE: Forest Service in consultation with ADF&G (SEIS Planning Record). See Consolidated Appendix, Volume III, C-3, theme response on data and models.

<sup>1</sup> This value represents the percent reduction in the entire minor harvest area.

<sup>2</sup> This value represents the percent reduction in the entire analysis area.

The winter range carrying capacity for deer in Southeast Alaska is related to the availability of forage. Forage availability is related to production of forage in the habitat and how much forage is covered by snow. Productive habitats under low snow conditions will support higher numbers of deer than less productive habitats or similar habitats under deep snow conditions. Predation can act as a significant controlling factor on deer populations, which is especially true in areas where gray wolves (*Canis lupus*) are present. Deer populations declined in Game Management Unit 3 (includes Analysis Area 12) from high densities to the lowest densities in Southeast Alaska during the period 1968 to 1974 (Smith et al. 1986, referenced in deer model). The initial decline was due to severe winter weather, and wolf populations have limited the recovery. This appears to indicate a strong interaction between winter severity and the overall effect of wolf predation on the deer. Black bear predation on fawns may also be limiting deer numbers in this area. As a result, the Board of Game has not allowed deer hunting on Kuiu Island since 1976.

A fall hunt during the 1986-87 season was allowed on Conclusion Island (Minor Harvest Area 2014) near the entrance of No Name Bay. The Sumner Strait Advisory Committee, however, requested that the Board of Game disallow a hunt during the 1988 season. The request was granted and no hunting was permitted.

## Black Bear

The black bear is distributed over 75 percent of Alaska (Erickson 1965). They utilize forested habitats for cover and do not stray far into open areas to obtain food. Little is known about black bear populations in Southeast Alaska, although densities occurring on Prince of Wales Island are believed to be the highest in Alaska (Erickson 1965). Kuiu Island has population densities similar to those found on Prince of Wales Island.

Black bears in Southeast Alaska spend about six months of each year inactive in dens. Throughout their range, they typically den in holes in hillsides, under logs and other objects, in hollow logs and trees, and in caves. Body temperature of denning black bears may be lowered 3 to 5 degrees Fahrenheit below normal, and metabolic rate is slightly reduced. The young, generally two or three, are born in the den following a seven-month gestation period (Erickson 1965).

The black bear is omnivorous. In early spring, grasses and forbs dominate the diet, and shrubs are added as foliage becomes available. A wide variety of fruit-producing plants are used during the summer. Berries and fleshy fruits constitute the early fall diet, with grasses increasing in importance as other foods become less available. For many black bear populations, animal predation supplements the diet and consists of insects and carrion. Black bears may also feed on fish during summer and fall salmon runs (e.g., on Prince of Wales Island, Meehan 1974). Bears also frequent open garbage dumps that occur in association with logging camps and other human habitation. This occurs at Rowan Bay.

Breaking up continuous forested habitat by clearcutting has the potential to increase bear populations by creating foraging areas with abundant preferred foods (Erickson 1965, Meehan 1974). The increased food supply on any given clearcut is short-lived, however. Canopy closure at age 15 to 25 years severely reduces available food supplies. Bear population increases brought about by logging may be expected to decline as second-growth stands enter the phase of minimal forage production (Meehan 1974).

Kuiu Island is a prized area for black bear hunting and supports a number of outfitters who guide nonresidents primarily during the spring hunt. Table 3-14 shows black bear harvest within ADF&G Minor Harvest Areas 2012, 2013, and 2014. The table reflects a trend toward increased harvest, especially in the last few years. Hunting access generally occurs more by float plane or boat rather than existing roads.



Black Bear

Table 3-14

**Number of Black Bears Harvested**

	Minor Harvest Area			
Year	2012	2013	2014	Total
<i>Resident</i>				
1980	3	0	0	3
1981	5	0	4	9
1982	4	5	3	12
1983	9	3	5	17
1984	11	4	3	18
1985	4	7	2	13
1986	10	6	11	27
1987	9	4	10	23
<i>Non-resident</i>				
1980	1	1	1	3
1981	5	0	4	9
1982	1	1	19	21
1983	13	2	11	26
1984	12	5	10	27
1985	12	6	24	42
1986	6	2	38	46
1987	9	3	41	53

SOURCE: ADF&G Annual Hunting and Trapping Reports, Juneau, AK.



*Pine Marten*

**Pine Marten**

Pine martens are animals that use overmature forests, including beach fringe and streamside areas. The species prefers mature conifer or mixed forest stands, although there are indications that it may be adaptable to a variety of forest habitats (Soutiere 1979). Use of habitat by the marten is related to occurrence and availability of foods and to cover characteristics. Extensive overmature forests have been called the mainstay of marten populations in the Pacific states because they provide many den sites and abundant prey items (Meslow et al. 1981).

Martens are active throughout the year. Their constant activities above the ground are believed to require considerable energy to raise or lower body temperature (Worthen and Kilgore 1981). As a result, they require proportionately large volumes of food during temperature extremes. They eat small mammals, birds, insects, and fruit. The red-backed vole is the staple food source throughout the year but is most important during the winter. The limited distribution of red-backed voles in Southeast Alaska may result in dependence of the marten on red squirrels. The use of birds and their eggs increases in the diet during June and July when they are most vulnerable to martens. Fruits, berries, and some insects make up a large part of the marten diet during late summer.

Snags provide martens with important den sites and sites for resting activities in both winter and summer (Spencer 1987). They utilize the tops of broken snags as resting sites in the summer and the cavities as den sites in winter and summer. Preferred snags have been reported to range from 16 to 58 inches diameter at breast height (dbh) (Cambell 1979, Simon 1980, and Spencer 1987).



Johnson (1981) summarized population densities from several sources and reported a range of 0.6 to 1.9 martens per square kilometer (1.6 to 4.9 per square mile). Martens are trapped for their furs, and would be vulnerable to habitat loss and increased access. On Kuiu Island, increased road access is not a great concern because private vehicle use is limited in the timber harvest camps and there is no ferry service for outside vehicles. Human access will remain similar to the current conditions; i.e., from the beach by boat.

Typically, pine martens are harvested in the winter by trapping. Access to the trapping areas is difficult because of winter conditions and the lack of roads. The trapper will generally get to a shoreline area by boat and then hike to his traplines. Table 3-15 shows pine marten harvest within ADF&G Minor Harvest Areas 2012, 2013, and 2014. The table shows a trend toward harvesting fewer pine marten, especially over the last several years. Minor Harvest Area 2012, however, did show an increased number of martens trapped in 1987-88.

A computer model was used to estimate the number of pine marten that could be sustained in Analysis Area 12, based on the projected habitat capability (Table 3-16). Several factors were considered including the type of forested lands, road density, and elevation. Forest land information was calculated from the timber layer of a Geographic Information System database being developed during revisions of the Tongass Land Management Plan. These lands included clearcuts from 0 to 25 years in age, second-growth timber, noncommercial forest, and commercial forest of low volume (8 to 20 MBF/acre), mid volume (20 to 30 MBF/acre), and high volume (30+ MBF/acre). Habitat use estimates were calculated for evaluations both below and above 800 feet.

The estimated pine marten numbers in Table 3-16 include information on carrying capacity at the start of the APC Contract (1961) and the present condition. The table shows that Analysis Area 12 on Kuiu Island could potentially carry approximately 890 pine martens in 1961. When the effects of open road density are considered, estimates to 1990 indicate that same area could carry approximately 515 pine martens, which represents a 41.9 percent reduction since 1961. Open roads are roads that are open to public access.

## Land Otter

Land otters generally occur close to the beach (Larsen 1983, Woolington 1984) in the areas recognized as beach fringe habitat. Some also occur along streams and lakes. Otters appear to be relatively intolerant of man, but they are opportunistic and will use man-made structures and log jams, as well as natural cavities and beaver lodges, for dens and resting sites.

Habitat selection is also a product of food availability. Food items include fish, abalone, sea urchins, chitons, crabs, and other marine invertebrates; however, fish are generally the main food source. Otters den and rest in root systems of trees, under logs and rocks, and in other protected sites. Radiotelemetry data show extensive movements along the coastline, and otter sightings in freshwater habitats are common.

Land otters are furbearers pursued by trappers, and the populations would be affected by increased access to trappers (assuming no change in current State regulations or limits and no downward trend in pelt values).

Typically, land otters are harvested in the winter by trapping. Access to the trapping areas is difficult because of winter conditions and the lack of roads. The trapper will generally travel to a shoreline area by boat and then hike to his traplines. Table 3-17 shows land otter harvest within ADF&G Minor Harvest Areas 2012, 2013, and 2014. The table shows a trend toward harvesting fewer land otters, especially over the last several years.



*Land Otter*

Table 3-15

**Number of Pine Martens Harvested**

Year	Minor Harvest Area			Total
	2012	2013	2014	
1984/1985	30	28	32	90
1985/1986	22	13	10	45
1986/1987	0	0	7	7
1987/1988	24	0	5	29

SOURCE: ADF&G Annual Hunting and Trapping Reports, Juneau, AK.

Table 3-16

**Estimated Pine Marten Numbers Based on a Habitat Capability Model**

VCU	Pre-APC 1961	1990	Percent Change
<i>Minor Harvest Area 2012</i>			
398	38	34	10.5
399	83	8	90.4
400	91	8	91.2
401	41	41	0
402	101	9	91.1
421	105	9	91.4
Subtotal	459	109	76.3 <sup>1</sup>
<i>Minor Harvest Area 2013</i>			
403	106	106	0
420	81	79	2.5
Subtotal	187	185	1.1 <sup>1</sup>
<i>Minor Harvest Area 2014</i>			
416	71	70	1.4
417	44	43	2.3
418	25	24	4.0
419	42	26	38.1
427	12	12	0
428	46	46	0
Subtotal	240	221	7.9 <sup>1</sup>
Total	886	515	41.9 <sup>2</sup>

SOURCE: Forest Service in consultation with ADF&G (SEIS Planning Record). See Consolidated Appendix, Volume III, C-3, theme response on data and models.

<sup>1</sup> This value represents the percent reduction in the entire minor harvest area.

<sup>2</sup> This value represents the percent reduction in the entire analysis area.

Table 3-17

### Number of Land Otters Harvested

Year	Minor Harvest Area			Total
	2012	1013	2014	
1979/1980	5	3	11	19
1980/1981	3	2	9	14
1981/1982	0	0	11	11
1982/1983	1	0	3	4
1983/1984	6	3	0	9
1984/1985	3	19	18	40
1985/1986	10	7	2	19
1986/1987	3	0	2	5
1987/1988	0	0	0	0

SOURCE: ADF&G Annual Hunting and Trapping Reports, Juneau, AK.

### Bald Eagle

The population of bald eagles is widely dispersed throughout Southeast Alaska during the breeding season. Bald eagles that breed along the coast tend to remain close to their breeding territory throughout the year if food is available. When not involved in nesting activities, however, these birds may temporarily move to feed at abundant sources of food. Habitats commonly used include beach fringe, some estuarine fringe, and streamside riparian. Bald eagles may also concentrate at feeding grounds in the spring. Throughout their range, bald eagles are opportunistic in their use of available food resources. Fish is the dietary mainstay in Southeast Alaska (Kalmbach et al. 1964). This study identified fish as 65.7 percent of the year-round diet, although a variety of other foods were taken. These included birds (18.8 percent), mammals (1.2 percent), invertebrates (2.0 percent), and carrion (12.3 percent).

Foraging methods of bald eagles include scavenging, hunting live prey, and stealing food from other eagles and other species of fish-eating birds (Evans 1982). Reports along the Chilkat River indicate that bald eagles fed on spawned out salmon carcasses during fall and winter. In summer, they fed on live fish as well as carcasses.

Breeding activities in Southeast Alaska begin as early as February, and involve establishment and defense of the breeding area. Typical nesting habitat along the coastline occurs in the old-growth forests with Sitka spruce trees comprising the majority of nest sites. The selected tree generally has a top that is bushy, broken, or deformed. Such tops are more likely to provide strong support for the massive nest that is built. The nest platform is typically constructed of sticks up to 4 feet long and 2 inches in diameter. Mosses are used to line the nest, along with lesser amounts of grasses, twigs, seaweed, and other debris. The eagles tend to use the same nest year after year, making repairs as needed. They often construct alternate nests, and occasionally switch their use to them.

Perching sites are an important component of bald eagle nesting habitat. They perch on tall trees and snags to scan the water and shore for food. They also use these vantage points to protect their nests from avian predators. Tall trees having a clear view of the nest and surrounding water provide the most valuable perching sites. Other functions suggested for perch trees include: sites for consuming prey, sites for display to attract potential mates, and conspicuous posts from which territory occupation may be signaled (Stalmaster et al. 1985).

Bald eagle populations in Southeast Alaska have increased since the establishment of the Memorandum of Understanding between the Forest Service and the US Fish and Wildlife



Bald Eagle



Table 3-18  
**Number of Eagle Nests**

VCU	Inventoried Nest Trees
398	51
399	21
400	31
401	17
402	18
403	6
405.1	0
416	42
417	28
418	10
419	25
420	35
421	14
427	0
428	3
Total	301

SOURCE: US Fish and Wildlife Service Bald Eagle Survey, Juneau, AK.

Service in 1968 and as amended in 1984 (Forest Service 1984) and the removal of a state bounty on bald eagles in 1952. This population increase resulted primarily from the protection of the eagles themselves and their nests by providing a 330-foot buffer strip around identified nesting sites. Population estimates based on transects flown by the Fish and Wildlife Service show an increase in number from about 7,000 birds in the early 1970s to over 12,000 in 1987 (Forest Service 1988b). During the same period, the number of bald eagle nests has also exhibited a marked increase. Bald eagles that nest within the Alaska region comprise over half of the bald eagle population of the entire 50 states and about one-third of the continental population. Table 3-18 shows the number of inventoried eagle nest trees by VCU for Analysis Area 12.

#### Vancouver Canada Goose

Vancouver Canada geese are unique among all subspecies of Canada geese in that they use forested habitat for nesting and brood rearing (Lebeda and Ratti 1983). Lebeda (1980) reported that Vancouver Canada geese made use of both noncommercial forest land and low-volume commercial forest land. They nest in wetlands that are found within these forest types (the presence of wetlands correlates with sparse forest cover in such areas). Feeding in wetland edges that may extend into surrounding forest occurs until the young can fly. When the young can fly, they range farther away to feed and eventually reach lush estuarine areas from where they may begin their fall migration south.

#### Threatened or Endangered Species

Consultation with the US Fish and Wildlife Service and National Marine Fisheries Service during preparation of the 1986-90 FEIS identified no inventoried resident threatened or endangered species in Analysis Area 12. Habitats for two migrating endangered species exist in the area or in the waters nearby. The American peregrine falcon (*Falco peregrinus anatum*) passes through the forests during spring and fall migration flights. The humpback whale (*Megaptera novaeangliae*) inhabits nearby waters, but there is no designated critical habitat



Vancouver Canada Goose

near areas of existing or planned log transfer facilities. Letters documenting the consultation process are found in Consolidated Appendix, Volume III, H.

## Fisheries

The fishing industry provides a major source of income for Southeast Alaska. Fishing, especially for salmon, is also a major source of subsistence for residents in the APC Contract area. Abundant streams and lakes in the area provide spawning and rearing habitats for pink (humpy), chum (dog), coho (silver), and sockeye (red) salmon. Steelhead trout, Dolly Varden char, and cutthroat trout occur in streams on Kuiu Island and contribute to a viable sport fishery. The maintenance of a strong and productive fishery is very important to the area's economy. Sustaining the production of salmon for commercial, sport, and subsistence harvest is dependent upon area-specific harvest management plans and habitat protection and is the most prominent objective behind the Forest Service's stringent Standards and Guidelines that are applied to all timber harvest activities. This section identifies the salmon production potential and aquatic habitat conditions in Analysis Area 12.

The average annual salmon production potential of streams in Analysis Area 12 exceeds 1.2 million pounds (see Table 3-19). Chum salmon contribute 51 percent of the production followed by pink salmon (44 percent) and coho salmon (5 percent). Most of the fish production potential comes from streams in VCUs 399 (Saginaw Creek), 400 (Security Creek), 402 (Rowan Creek and Browns Creek), 403 (Kutlaku Creek and Kwatahein Creek), 405.1 (Alecks Creek), 420 (Slippery Creek and Port Camden Creeks), and 421 (Kadake Creek). Kadake Creek is the largest stream system on Kuiu Island and provides the largest potential production of salmon. Most of the streams in this area also support anadromous trout and char populations. The three major sport fishing streams are Kadake Creek, the Kutlaku system, and Rowan Creek.

Table 3-19

### Average Annual Weight of Salmon Available for Commercial Harvest in Thousands of Pounds<sup>1</sup>

VCU	Pink	Chum	Coho	Total
398	9.6	1.6	2.4	13.6
399	38.8	51.1	3.4	93.3
400	82.0	88.5	10.2	180.7
401	5.1	0.0	1.4	6.5
402	77.7	117.0	4.7	199.4
403	54.9	54.3	7.5	116.7
405.1	0.0	0.0	0.0	0.0
416	33.4	43.2	2.8	79.4
417	10.8	6.7	2.0	19.5
418	21.4	26.3	2.1	49.8
419	22.8	21.4	3.2	47.4
420	20.3	23.0	2.3	45.6
421	90.3	123.6	7.6	221.5
427	9.9	12.0	1.0	22.9
428	59.8	63.2	7.6	130.6
Total	536.8	631.9	58.2	1226.9
Percent	43.8	51.5	4.7	100.0

<sup>1</sup> Based on data from Holstine and Colltzi (1984).





*Port Camden Fisheries  
Project*

A description of stream conditions in this analysis area is facilitated by use of a three-level stream classification system, which is described in the Aquatic Habitat Management Handbook (Forest Service 1986a). Each stream is subdivided into Aquatic Habitat Management Units (AHMUs), which are based on fish use and stream channel characteristics. The areas defined by an AHMU includes the stream channel, areas within braided stream channels, and adjacent riparian areas containing side channels and sloughs. In the absence of any site-specific information it includes an area at least 100 feet wide on either side of the stream.

Class I streams are defined as stream channels that are accessible to anadromous fish (pink, chum, sockeye, and coho salmon) or channels upstream of migration barriers that have reasonable enhancement opportunities for anadromous fish, and high quality resident fish habitat. Class II streams are defined as channels that have a steep gradient (6 to 15 percent) and generally only contain resident fish populations (cutthroat trout and Dolly Varden char) or channels that are upstream of a migration barrier. Class II channels may contain marginal anadromous fish habitat. Class III streams do not have fish populations but have potential water quality influence on downstream aquatic habitats in Class I and Class II channels. Since these streams do not contain fish, they are not included in the analysis of potential impacts of the proposed alternatives in Chapter 4.

Analysis Area 12 has 348 miles of usable stream habitat for salmon, trout, and char (Table 3-20). Class I and Class II streams account for 81 percent (281 miles) and 19 percent (68 miles), respectively, of the available fish habitat. This habitat is widely distributed over 81 streams; 7 streams each have greater than 10 miles of habitat and 74 are small coastal streams with less than 10 miles of habitat each. The No-Action - Current Direction and No Further Harvest Alternative map accompanying this document shows the Class I and Class II streams. These stream classifications are also available in the planning record maps at the Petersburg office.

Only a small number of the 81 streams listed in Table 3-20 have been affected by timber harvest activities in Analysis Area 12. Fourteen streams (34.4 miles of habitat) have had timber harvest adjacent to the stream (i.e., either harvest to the stream bank or with a buffer zone; Table 3-21). The relative level of timber harvest to the stream bank along individual Class I and Class II streams ranges from 2.3 to 46.2 percent and from 2.7 to 66.7 percent, respectively. Harvest with buffer zones along Class I and Class II streams ranges from 2.0 to 57.1 percent and from 7.7 to 43.5 percent, respectively. Streams affected by logging roads and stream crossings as of September 1988 are listed in Table 3-22. Logging roads occur



Table 3-20

## Miles of Stream by AHMU Class

VCU	Stream <sup>1</sup>	Class I <sup>2</sup>	Class II <sup>2</sup>	VCU	Stream <sup>1</sup>	Class I <sup>2</sup>	Class II <sup>2</sup>
398	109-42-10400	4.4	2.4	416	105-31-10220	0.5	0
	109-42-10500	0	0.6		105-31-10211	0.3	0
	109-42-10550	0.6	0		105-31-10205	0.3	0.6
399	109-44-10020	0	0.9		105-31-10200	3.4	1.5
	109-44-10025	0.7	0		105-31-10190	0.4	4.3
	Straight Creek	6.2	0.6	417	105-31-10180	1.3	1.7
	109-44-10370	3.9	0		105-31-10150	0.4	0.2
	Saginaw Creek	11.7	0		105-31-10140	0.7	1.8
	Ledge Creek	1.4	1.3		105-31-10120	1.1	0
400	Dean Creek	5.1	0		105-31-10115	1.3	0.6
	109-45-10090	2.7	2.6		105-31-10110	0.5	0.4
	109-45-10100	8.3	2.3		105-31-10100	2.0	0
	Security Creek	4.9	0		105-31-10090	1.0	0
	109-45-10150	3.8	0	418	105-32-10860	0.4	0
	109-45-10160	1.7	0		105-32-10850	0.4	2.3
	109-45-10170	1.5	0		105-32-10840	0.4	0
	109-45-10190	1.0	0		105-32-10820	5.7	0
401	109-45-10050	0.7	0		105-32-10800	4.9	0
	Washington Bay	1.0	0	419	105-32-10750	2.3	0
402	109-52-10010	1.4	0		105-32-10730	3.1	0
	109-52-10020	2.3	0		105-32-10700	1.1	0
	109-52-10040	0.9	0		105-32-10690	5.2	9.7
	109-52-10045	0.8	0		105-32-10670	2.1	0
	109-45-10050	1.2	0	420	109-43-10018	0.6	0.8
	Rowan Creek	19.8	5.8		Slippery Creek	16.7	4.0
	Brown's Creek	8.8	11.0		109-43-10035	1.0	0
	109-52-10120	0	0.6		109-43-10040	0.6	0
403	109-52-10200	1.9	0		109-43-10050	0.3	0
	109-52-10280	1.3	0		E. Port Camden	0.5	0
	109-52-10300	3.4	0		W. Port Camden	0.1	0
	Kutlaku Creek	2.7	0.6		109-43-10120	3.8	0
	109-52-10470	1.7	0		109-43-10160	3.5	0
	109-52-10500	0	0	421	Kadake Creek	58.4	2.9
	Kwatahein Creek	16.0	1.6	427	105-32-10250	1.9	0
416	105-10-10010	0.7	2.8	428	105-32-10280	1.1	0
	105-31-10300	0.3	0		105-32-10290	2.1	0
	105-31-10295	0.5	0		105-32-10300	7.0	0
	105-31-10290	0.4	0		105-32-10320	5.8	0.4
	105-31-10270	3.0	0.7		105-32-10400	5.9	0.5
	105-31-10260	1.8	0.5		105-32-10450	3.1	0.8
	105-31-10250	0.8	0				
Total						280.8	67.6

SOURCE: SEIS Planning Record.

NOTE: See the No-Action - Current Direction and No Further Harvest Alternative Map accompanying this document.

<sup>1</sup> Streams without names are identified by ADF&G assigned numbers.

<sup>2</sup> Stream segments labeled Class I have anadromous fish; Class II have resident fish.

Table 3-21

**Miles of Prior Timber Harvest Adjacent to Streams, and Percentage of AHMU<sup>1</sup> with Adjacent Harvest in Class I<sup>2</sup>**

VCU	Stream <sup>3</sup>	AHMU Miles	Cut <sup>4</sup>		Buffer <sup>5</sup>	
			One Side	Both Sides	One Side	Both Sides
<i>Miles</i>						
398	109-42-10400	4.4	0.5	0	0.2	0
399	Straight Creek	6.2	0.6	0.3	0	
	109-44-10370	3.9	0	0	0.5	0
	Saginaw Creek	11.7	1.6	2.6	1.4	0
400	Dean Creek	5.1	0.3	0.6	0.1	0
	109-45-10090	2.7	0	0	0.4	0
	109-45-10100	8.3	0.2	0.3	1.6	0
402	Rowan Creek	19.8	0	1.8	0.4	0
	Brown's Creek	8.8	0.2	0.9	0.7	0
403	109-52-10200	1.9	0	0	0.3	0
417	105-31-10140	0.7	0	0	0	0.4
	105-31-10115	1.3	0.6	0	0	0
	105-31-10110	0.5	0.2	0	0	0
421	Kadake Creek	58.4	3.6	1.8	2.9	0
Total		133.7	7.8	8.3	8.5	0.4
<i>Percent</i>						
398	109-42-10400		11.4	0	4.5	0
399	Straight Creek		9.7	4.8	0	0
	109-44-10370		0	0	12.8	0
	Saginaw Creek		13.7	22.2	11.9	0
400	Dean Creek		5.9	11.8	2.0	0
	109-45-10090		0	0	14.8	0
	109-45-10100		2.4	3.6	19.3	0
402	Rowan Creek		0	9.1	2.0	0
	Brown's Creek		2.3	10.2	8.0	0
403	109-52-10200		0	0	15.8	0
417	105-31-10140		0	0	0	57.1
	105-31-10115		46.2	0	0	0
	105-31-10110		40.0	0	0	0
421	Kadake Creek		6.2	3.1	5.0	0
Total <sup>6</sup>			5.8	6.2	6.4	0.3

Source: SEIS Planning Record.

NOTE: See the No-Action - Current Direction and No Further Harvest Alternative Map accompanying this document.

<sup>1</sup> Designated Aquatic Habitat Management Units.

<sup>2</sup> Stream segments labeled Class I have anadromous fish; Class II have resident fish.

<sup>3</sup> Streams without names are identified by ADF&G assigned numbers.

<sup>4</sup> Cut is defined as harvest to the stream bank with no merchantable timber left standing.

<sup>5</sup> Buffer means that trees are left standing along a stream according to AHMU prescriptions.

<sup>6</sup> This value represents the percent of AHMU miles affected in the entire analysis area.

### 3 Affected Environment

Table 3-22

#### Miles of Prior Timber Harvest Adjacent to Streams, and Percentage of AHMU<sup>1</sup> with Adjacent Harvest in Class II<sup>2</sup>

VCU	Stream <sup>3</sup>	AHMU	Cut <sup>4</sup>		Buffer <sup>5</sup>	
		Miles	One Side	Both Sides	One Side	Both Sides
<i>Miles</i>						
398	109-42-10400	2.4	0	0	0.6	0
399	Straight Creek	0.6	0.4	0	0	0
	109-44-10370	0	0	0	0	0
	Saginaw Creek	0	0	0	0	0
400	Dean Creek	0	0	0	0	0
	109-45-10090	2.6	0.3	0.4	0.2	0
	109-45-10100	2.3	0.8	0	1.0	0
402	Rowan Creek	5.8	0	2.5	0.5	0
	Brown’s Creek	11.0	0.8	0.3	1.1	0
403	109-52-10200	0	0	0	0	0
417	105-31-10140	1.8	0	0	0	0
	105-31-10115	0.6	0	0	0	0
	105-31-10110	0.4	0	0	0	0
421	Kadake Creek	2.9	0.1	0.4	0	0
Total		30.4	2.4	3.6	3.4	0
<i>Percent</i>						
398	109-42-10400		0	0	25.0	0
399	Straight Creek		66.7	0	0	0
	109-44-10370		0	0	0	0
	Saginaw Creek		0	0	0	0
400	Dean Creek		0	0	0	0
	109-45-10090		11.5	15.4	7.7	0
	109-45-10100		34.8	0	43.5	0
402	Rowan Creek		0	43.1	8.6	0
	Brown’s Creek		7.3	2.7	10.0	0
403	109-52-10200		0	0	0	0
417	105-31-10140		0	0	0	0
	105-31-10115		0	0	0	0
	105-31-10110		0	0	0	0
421	Kadake Creek		3.4	13.8	0	0
Total <sup>6</sup>			7.9	11.8	11.2	0

Source: SEIS Planning Record.

NOTE: See the No-Action - Current Direction and No Further Harvest Alternative Map accompanying this document.

<sup>1</sup> Designated Aquatic Habitat Management Units.

<sup>2</sup> Stream segments labeled Class I have anadromous fish; Class II have resident fish.

<sup>3</sup> Streams without names are identified by ADF&G assigned numbers.

<sup>4</sup> Cut is defined as harvest to the stream bank with no merchantable timber left standing.

<sup>5</sup> Buffer means that trees are left standing along a stream according to AHMU prescriptions.

<sup>6</sup> This value represents the percent of AHMU miles affected in the entire analysis area.



Table 3-23

**Number of Road Crossings per Stream by AHMU Class<sup>1</sup>**

VCU	Stream <sup>2</sup>	Road Miles		Road Crossings	
		Class I <sup>3</sup>	Class II <sup>3</sup>	Class I <sup>3</sup>	Class II <sup>3</sup>
398	109-42-10400	4	2	2	0
399	Straight Creek	6	1	4	0
	109-44-10370	4	0	1	0
	Saginaw Creek	12	0	10	0
400	Dean Creek	5	0	1	0
	109-45-10090	3	3	0	2
	109-45-10100	8	2	3	2
402	109-52-10045	1	0	1	0
	Rowan Creek	20	6	10	3
	Brown's Creek	9	11	7	6
403	109-52-10200	2	0	1	0
421	Kadake Creek	58	3	32	2
Total		132	28	72	15

SOURCE: SEIS Planning Record.

NOTE: See the No-Action - Current Direction and No Further Harvest Alternative Map accompanying this document.

<sup>1</sup> Only streams with road crossings are included in this table.

<sup>2</sup> Streams without names are identified by ADF&G assigned numbers.

<sup>3</sup> Stream segments labeled Class I have anadromous fish; Class II have resident fish.

along 12 Class I and 7 Class II streams. Stream crossings have been constructed on 11 Class I streams and on 5 Class II streams (Table 3-23).

## Watersheds

The water quality of streams throughout Southeast Alaska is good in terms of sediment levels, temperatures, and water chemistry. A combination of steep slopes, heavy precipitation, and the limited water-holding capacity of watersheds results in predictable seasonal flow characteristics.

### Stream Temperature

Summer temperatures in main channel streams in the study area normally range from 37 degrees to 52 degrees Fahrenheit, but may occasionally exceed 60 degrees. Frequent cloudiness, low air temperatures, steep channel gradients, and frequent precipitation that characterize this region keep stream temperatures below the range considered harmful to fish. However, several streams in Analysis Area 12 are known to be temperature sensitive. Fish kills due to high temperature have been documented for Rowan Creek and Brown Creek (VCU 402), stream number 105-10-10320 (VCU 411), and Alecks Creek (VCU 405). Also five other streams that have lakes upstream (VCUs 417, 418, and 419) have had measured temperatures indicating possible temperature sensitivity. Factors that lead to these events include extended dry and low-flow periods, high air temperatures, and large salmon runs that become isolated in stream pools. Valley and stream riparian characteristics and the presence of lakes may also contribute to conditions that lead to these fish-kills.

Winter stream temperatures range from 32 degrees to 37 degrees Fahrenheit. Cold winter temperatures may be an important limiting factor to fish production. A two- to six-week



period of sustained subfreezing weather generally occurs annually between November and February in Southeast Alaska. The combined effects of severely reduced stream runoff and low air temperature can cause freezing of stream surface and intergravel water. Low temperature problems are generally most acute under conditions of: elevations above 200 feet, low surface runoff, streams with little ground-water recharge, and little or no snow cover. Streams located in alluvial bottomlands with significant ground-water recharge are least susceptible to low temperature problems.

## Sediment

Soil erodability in this region is relatively low. Natural sediment yields vary greatly throughout the year as storms affect chronic natural sources of surface and streambank erosion and trigger mass failure. Steeper slopes have a greater potential to produce sediment when subject to activities such as road construction and timber harvesting. Some debris from mass failures does not reach a stream channel, but is deposited (on-site) at the foot of a slope. This material contributes to the development of colluvial soils which are a part of the natural landform.

Sediment can move to a stream channel either suspended in water or as a mass. The amount of sediment which is suspended or deposited in a channel at a given time depends on the amount of debris input, channel characteristics, and the amount of streamflow. Landslides can be several acres in size and often occur naturally. The entry of sediment into the stream can severely affect water quality, but the effect is usually temporary and decreases as higher streamflows transport suspended sediments and bedload debris downstream. Eventually, nearly all the fine material entering a channel is routed through the system and deposited in estuaries.

## Streamflow

Runoff in the analysis area is relatively high per square mile. Perennial streams are common due to the frequency of rainfall and its distribution throughout the year. Drainage density is high with a vast network of small channels feeding into the larger streams.



*Typical Coast Land in  
Southwest Alaska*



Peak streamflow typically occurs with the heavy precipitation in the fall. Low flows occur from late December through April due to freezing weather, and also in the summer due to dry weather. Occasional storms throughout the year can cause minor increases in streamflow.

## Marine Environment

Approximately 48,000 kilometers (30,000 miles) of tidal shoreline, roughly 60 percent of the total Alaskan coast, comprises Southeast Alaska's coastline. Within this region occurs a great diversity of habitats that collectively account for the complexity of Southeast Alaska's estuarine and tidal environments.

The marine environment encompasses a wide variety of ecosystems. This section deals primarily with the intertidal and subtidal marine environments that are subject to effects from log transfer and storage facilities, since those are the points of concentrated activity associated with the marine transportation of logs. The preferred sites for log transfer facilities, log storage areas, camp settlements, and anchorages are deep bays, or along straits or channels. Other marine areas are not addressed here because they are not expected to be affected by activities associated with the timber harvest being evaluated in this SEIS. Activities outside the areas of concentration are widely dispersed and any potential effects would be short-term and/or diluted below detectable thresholds. This document describes the current conditions at Rowan Bay and Saginaw Bay LTFs as a basis for evaluating the incremental impacts associated with the alternatives for completing the 1986-90 Operating Period. It also addresses the No Name Bay area where one alternative proposes a new log transfer facility.

The shallow marine waters and associated mud flats and estuaries that are found in the protected coves and bays provide vital habitat for some important species, such as Dungeness



crab and juvenile salmon. They are part of a complex and dynamic ecosystem that includes shrimp, flatfish, marine worms, echinoderms, sponges, sea anemones, shellfish, plankton, marine algae, and other organisms.

The potential impacts that are of concern at log transfer sites relate primarily to the deposition of bark. Laboratory tests show that bark deposits may be a source of toxic organic leachates that may be deleterious to salmon fry and crab larvae. The accumulated bark may also smother benthic organisms. The rate of bark accumulation varies with conditions at each facility. The design of the facility partially determines the amount of bark lost (directly associated with the speed of log entry into the water), and the configuration of the location determines the dispersion of the bark by currents and winds. Log raft storage areas accumulate bark at a much slower rate than the immediate area of the log transfer facility. Little quantified information is available that documents decomposition, flushing, recovery times, recolonization rates, or other information about the longevity of bark and its effects on the marine benthic habitat.

An effect of bark and debris accumulation is that little-neck clams and bay mussels have been shown to be eliminated when as little as 4 to 5 inches of bark accumulated (Freese and O'Clair 1984). Further, Conlan and Ellis (1979) and Karau (1975) reported molluscs and several polychaetes were excluded by bark debris greater than 2.5 centimeters in thickness, and the effects of bark may last several decades. Deposition of more than a 1-centimeter layer of wood waste has been observed to produce losses of suspension feeding benthos, with major community composition changes at 5-centimeter accumulation (Conlan and Ellis 1979). In 15-centimeter deposits, suspension feeding organisms were absent and the area was dominated by a few abundant deposit feeding organisms. It can be assumed that other plants and animals that live in and on the bottom would be similarly affected. The Rowan Bay and Saginaw Bay facilities have been in operation long enough that deposited bark is a feature of these sites. Freese (1987) indicates that once benthic deposits of bark are in place, they are very resistant to decomposition or transport away from the immediate area. However, the area impacted by bark is relatively restricted. At 13 LTFs evaluated in Southeast Alaska, bark deposits averaged 2.4 acres per site.

Toxic substances, occurring as leachates from bark, precipitate in saltwater; therefore, leachates do not appear to be a major problem in open water or where good circulation exists (Gibbons 1982, Sedell and Duval 1985). Recently, dissolved substances, such as hydrogen sulfide and ammonia, have been shown to occur in the interstitial water of bark deposits when bark accumulates on the bottom (O'Clair and Freese 1984). These substances remain within the bark and do not go into solution. However, if Dungeness crabs burrow into the bark deposit, a decrease in reproductive fecundity, egg maturation, eating habits, and overall survival can be demonstrated. It should be noted that this type of effect has been observed in only one bark accumulation in the field (Rowan Bay log transfer facility) and that, in general, crabs were not found in bark accumulations at a number of other log transfer facility locations. Studies have demonstrated that waste wood leachates are toxic in concentrated form to fish and shellfish, such as shrimp and salmon. However, in the natural environment, toxic concentrations should not be reached due to adequate flushing and circulation. Regulations requiring monitoring of bark and wood accumulation help minimize damage to the marine environment.

Other effects associated with existing log transfer facilities relate to oil, grease, and petroleum pollution. The source of these contaminants may be the operation and maintenance of equipment used in log handling and transfer operations. Persistent loss of small volumes of petroleum products is a concern, as water soluble compounds have been shown to be toxic to marine larvae and eggs at concentrations of 0.1 mg/l. Daily monitoring for the presence of any visible oil sheen on the water is often a permit requirement.

Five catalogued anadromous fish streams enter No Name Bay. Fish inventory data indicate that No Name Bay is a relatively low producer of commercial salmon, although fry and adult salmon use the bay for rearing and feeding.

Adult crab are caught commercially in the vicinity of No Name Bay. Some are caught in No Name Bay, but the bay is not a large producer of Dungeness crab. In the Alaska Department of Fish and Game Statistical Subdistrict 105-31, average harvest of Dungeness crab was 39,000 pounds for 14 years of harvest between 1969 and 1984. This subdistrict included No Name Bay, Reid Bay, Alvin Bay, and Sumner Straits east to Kupreanof Island and south to Point Baker. Few crab pot floats have been observed in No Name Bay, during site visits by Forest Service employees, and during a cooperative survey by ADF&G and Forest Service employees, and most of the crab harvest from Subdistrict 105-31 is thought to occur in locations other than No Name Bay.

## Land Status

This section presents descriptions of land uses and land ownership.

### National Forest Land Uses

Historically, mining activities appear to have commenced in the early 1950s and have continued periodically into the 1980s. As for the present day mining activities, the March 1, 1989 Bureau of Land Management (BLM) mining activity report lists 12 lode mining claims involving a total of approximately 248 acres on Kuiu Island. The majority of these claims are located in the Kadake Bay area with a few in the Saginaw Bay area. The number of claims fluctuates as new claims are staked and old claims are abandoned. No claims have been known to be actively worked for several years.

There are three types of land use agreements in effect on Kuiu Island. A Memorandum of Understanding is an agreement between the Forest Service and another agency and is mutually enforced. Special use permits are allocated to agencies or individuals for land use or improvements and are under Forest Service Jurisdiction. The third type of agreement, native allotment applications, are applications for native selections on file with the BLM enabled by the Allotment Act of 1906 and pending conveyance. In Analysis Area 12, 12 land use agreements are in effect (Table 3-24). Three Memorandums of Understanding are in place in Analysis Area 12. One is with the Federal Aviation Administration for a radio communication site and one is with the US Army Corp of Engineers for an anemometer site. The Northern Southeast Regional Aquaculture Association operates a fisheries enhancement project in Port Camden (in conjunction with the Forest Service and Alaska Department of Fish and Game) under the third Memorandum of Understanding.

Special use permits have been issued for various land uses and improvements on Kuiu Island and are listed in Table 3-24.

The Allotment Act of 1906 enabled individual natives of Alaska to acquire up to 160 acres of land. This is a separate program from the Native Selection land, which was authorized by the Alaska Native Claims Settlement Act of December 18, 1971. Three Native Allotment applications for allotments in Analysis Area 12 have been filed with the BLM. It should be recognized that additional applications may be filed before the allotment program is completed.

Miscellaneous land uses include the logging camp and the Forest Service work center at Rowan Bay. The Forest Service and the logging contractor both have radio repeater sites, respectively located on Kuiu Mountain and a hill nine miles northeast of the camp. The Forest Service maintains an administration cabin at Slippery Lake used in conjunction with fisheries management. Two public recreation cabins are on the island, one at Kadake Bay and the other at Devils Elbow.



Table 3-24

## Land Use Agreements

Authorization	VCU	Place Name	Use
Native Allotment Applications (Allotment Act of 1906)	403	Bay of Pillars	#AA8009
	420	Port Camden	#AA6547
	420	Port Camden	#AA6579
Memorandum of Understanding	398	Keku Islets	Anemometer Site
	405.1	Kuiu Moutaintop	Radio Communication Site
	420	Port Camden	Fish Enhancement
Special Use Permit	399	Saginaw Bay	Residence
	399	Saginaw Bay	Outfitter Guide
	400	Security Bay	Waterline
	405.1	Kuiu Moutaintop	Radio Communication Tower
	417	No Name Bay	Outfitter Guide
	420	Kadake Bay	Outfitter Guide

SOURCE: SEIS Planning Record.

## Land Ownership

There are approximately 1,260 acres of land within the study area that are not managed by the Forest Service. The land ownership and parcel size of non-National Forest lands are given in Table 3-25. The Alaska Native Claims Settlement Act of 1971 provided for Native selection of Federal lands. To date, a total of 46.7 acres of National Forest land within the study area have been conveyed to Native corporation ownership. This acreage has been made up of small parcels of land with historical significance (i.e., village sites and grave sites) and should not be disturbed by Forest Service land management activities. There have not been any large contiguous areas conveyed. The Sealaska Corporation has selected for conveyance approximately 4,500 acres of land near Saginaw Bay (VCUs 398 and 399). The conveyance of this land is low on the Corporation's priority list. If the Corporation's maximum allowable acreage is reached before this conveyance is considered, this area may remain National Forest land. Because this land has been selected, all on-the-ground management activities must first have Sealaska and Kake Tribal Corporation agreement.

Native historic sites (14H1 sites) have been conveyed to Sealaska Corporation. They are located in VCUs 398, 399, and 403. These lands are treated as land privately owned by Sealaska Corporation. Four Native Allotment Act Claims within Analysis Area 12 still require coordination with the Bureau of Indian Affairs. These are located in VCU 403 (Bay of Pillars) and VCU 420 (Port Camden).

There are four small parcels of land on Kuiu Island in the BLM system. Two are located in Security Bay (VCU 400), one in Saginaw Bay (VCU 399), and the other in Seclusion Harbor (VCU 448). These parcels are homesites that were applied for but never patented; therefore, they were never conveyed to private ownership. To eliminate these inholdings, the Forest Service has filed a request for the parcels to be returned to the National Forest System.

The Lighthouse Act of June 10, 1910 provided for lands to be withdrawn from the National Forest for lighthouse purposes. These lands (Table 3-25) are under US Coast Guard jurisdiction, however, Forest Service management activities may take place on lighthouse reserves if approved by the Coast Guard.





Table 3-25

### Ownership of Non-National Forest Lands

Ownership	VCU	Place Name	Acres
Native Selection (ownership as granted by ANCSA of 1971)	398	Keku Islets	0.2
	398	Keku Straits	6.0
	399	Saginaw Bay	9.0
	399	Saginaw Bay	8.5
Private Land	403	Bay of Pillars	11.5
	403	Bay of Pillars	11.2
Bureau of Land Management	399	Saginaw Bay	5.0
	400	Security Bay	5.0
	400	Security Bay	4.8
	418	Seclusion Harbor	3.5
Lighthouse Reserve (withdrawn for U.S. Coast Guard)	400	Security Bay	23.3
	401	Washington Bay	7.2
State of Alaska	400	Security Bay	500.0
	402	Rowan Bay	665.0

SOURCE: SEIS Planning Record.

Land selection by the State on Kuiu Island is authorized by the Alaska Statehood Act and the Alaska National Interest Lands Conservation Act. A marine park has been designated at Security Bay in VCU 400 by the State. No facilities currently exist at the marine park. Mooring buoys and a floating dock are planned for the future. Coordination with the State Department of Natural Resources is required for any activities in or adjacent to the marine park.

The State of Alaska has also made a land selection in Rowan Bay in VCU 402. This selection has been approved by the Regional Forester, but lands needed to continue the APC Contract were excluded from selection. Proposed State selections in VCU 417 (No Name Bay), 419 (Threemile Arm), and 420 (Port Camden) have resulted in one consolidated selection at No Name Bay. This selection will accommodate the Forest Service need for a log transfer facility at No Name Bay.

## Recreation

### Current Use

Popular recreation activities on Kuiu Island include fishing, hunting, and boating, by kayak, sailboat, and motorboat. Sporadic waterfowl hunting occurs in the estuaries. Black bear are prevalent and are hunted throughout the study area. Visitors fish for salmon, steelhead, and other trout species in many of the Island's streams and harvest edible shellfish, crab, and shrimp from the Island's bays. Other common activities include camping, hiking, wildlife viewing, beachcombing, and prospecting. Outfitter guides currently provide service in Saginaw, Kadake, and No Name Bays. These guides operate on annually renewed special use permits.

Although recreational opportunities abound on Kuiu Island, numbers of users are low, averaging less than 550 recreation visitor days per year at two Forest Service cabins over the

# 3 Affected Environment

## *Recreation Opportunities in Southeast Alaska Include Sport Fishing*



last ten-year period (Figure 3-6). This low use is largely attributable to the Island's limited access and remoteness. There are no regularly scheduled means of public transportation to Kuiu Island, although air taxi service is available on a charter basis. Roads that access the interior of the study unit are not linked to any inter-island transportation network. The closest Alaska Marine Highway ferry terminal is located in the community of Kake, which is approximately 10 miles from Port Camden Bay across open water.

Developed facilities within the study area are limited to a few canoe/kayak portage trails that provide access to the Tebenkof Bay Wilderness, and two Forest Service recreation cabins along the Island's eastern shore. Recreation-use data has been collected and is summarized in Table 3-26 for Kadake Bay cabin, Devils Elbow cabin, and the canoe/kayak portage trails. The data are recorded in recreation visitor days, which represent 12 hours spent per day in a recreation activity. Additional information on areas used or enjoyed for recreational or subsistence purposes is available as part of a survey conducted by the Southeast Alaska Conservation Council. Expected future trends in recreation use are described in Chapter 4, Environmental Consequences.

## Recreation Opportunities

Two procedures were used to inventory recreation resources: Recreation Opportunity Spectrum (ROS) classification and a survey of "recreation places." The ROS classes were mapped for all of Kuiu Island and provided a framework for assessing the current recreation setting. The survey of "recreation places" identified specific high value recreation sites within the broader ROS inventory. Recreation places were selected based on characteristics or qualities of the site that influence visitor use.

### Recreation Opportunity Spectrum

The ROS classification is a method used to delineate areas of the Tongass National Forest into similar recreation areas based on a combination of activities, settings, and associated user experiences. Each similar area is placed in an ROS class that ranges from the least developed "pristine" or "primitive" classes to a more developed "rural" class. An area rated "pristine" or "primitive" provides for activities in the most remote and least accessible settings. Areas classed "semi-primitive" are less remote and provide easier access. The semi-primitive classification has been divided into motorized and nonmotorized in the study area. These classifications are influenced by the presence of motorized boats as well as off-road vehicles. The

Figure 3-6

**Recreation Use on Kuiu Island of the Stikine Area, Tongass National Forest<sup>1</sup>**



SOURCE: Recreation Information Management System (RIMS) database, 1987, Stikine Area Supervisor's Office, Petersburg, AK.

<sup>1</sup> Does not include tour boat, ship or ferry use.

Table 3-26

**Recreational Use of Cabins and Portage Trails from 1978 Through 1987 in Recreation Visitor Days (RVDs)<sup>1</sup>**

Year	Kadade Bay Cabin	Devils Elbow Cabin	Portage Trails <sup>2</sup>
1978	192	394	—
1979	98	176	—
1980	150	526	—
1981	304	478	—
1982	48	324	—
1983	132 <sup>3</sup>	224	—
1984	60	212	—
1985	346	258	—
1986	516	92	85
1987	338	276	100
Total	2,052	2,960	185

SOURCE: Data on cabin use is collected from cabin permits issued by the Tongass National Forest (Forest Service Recreation Report, Stikine Area Supervisor's Office, Petersburg, AK).

<sup>1</sup> Recreation Visitor Day (RVD) = 12 hours spent in a recreation activity (party size times number of days).

<sup>2</sup> Portage trails were constructed in 1985, therefore no use information was available until 1986.

<sup>3</sup> For a portion of 1983, Kadake Cabin was closed for maintenance.



“roaded” class reflects a higher degree of development and provides a setting for motor vehicle recreation activities.

Table 3-27 presents the percentage of land in each ROS class by VCU and for Analysis Area 12. Percentages represent the existing environment and include National Forest land and private land. Currently, 34 percent of the study area is classified as roaded modified. Roaded modified classes occur in areas previously logged north and west of Port Camden and on eastern Kuiu Island, where logging took place in the early 1900s. One percent of Analysis Area 12 is roaded natural, and less than 1 percent is rural, reflecting the logging community at Rowan Bay. Fifteen percent of Analysis Area 12 is semi-primitive nonmotorized, and 10 percent is semi-primitive motorized. Pristine (25 percent), and primitive opportunities (15 percent) can be found on Forest land within the Bay of Pillars, north of Threemile Arm, east of Security Bay, and on eastern Kuiu Island in VCUs 405.1, 416, 417, and 418.

## Recreation Places

In theory, all acres of Forest land have some potential for providing recreation opportunities. Terrain, access, user preference, and other features, however, make some areas more highly valued by recreationists. Identification of these highly valued sites, called “recreation places,” allows recreation resource specialists to more accurately evaluate the potential effects of the alternatives. Following is a description of the recreation places in each VCU. The description includes the kind of recreation activities that occur in these areas, although no data is available on the level of each activity.

Table 3-27

## Percentages of VCUs in Recreation Opportunity Spectrum Classes

VCU		Pristine	Primitive	Semi-Primitive Non-Motorized	Semi-Primitive Motorized	Roaded Natural	Roaded Modified	Rural
398	Keku Island	0	0	54	22	0	24	0
399	Saginaw Bay	0	0	24	18	0	58	0
400	Security Bay	0	2	33	14	0	51	0
401	Washington Bay	46	40	0	14	0	0	0
402	Rowan Bay	8	3	16	7	1	64	— <sup>1</sup>
403	Bay of Pillars	43	28	0	12	9	8	0
405.1	Alecks Lake	100	0	0	0	0	0	0
416	Alvin Bay	49	41	0	0	0	10	0
417	No Name Bay	27	62	0	0	0	11	0
418	Seclusion Bay	35	44	16	0	0	5	0
419	3-Mile Arm	19	2	19	0	0	60	0
420	Port Camden	41	8	24	17	0	10	0
421	Kadake Bay	0	0	16	6	0	78	0
427	Keku Strait	54	6	0	36	0	4	0
428	Rocky Pass	72	28	0	0	0	0	0
Average Percentage for All VCUs		25	15	15	10	1	34	0

SOURCE: Forest Service Recreation Report, Stikine Area Supervisor's Office, Petersburg, AK.

<sup>1</sup> The Rowan Bay logging community is placed in the rural ROS class and comprises less than 1 percent of the study area.

VCU 398 - Keku Islands: Several anchorages have been identified along Keku Strait. These sites provide boat protection from southeasterly storms. Beachcombing is possible east of Halleck Harbor.

VCU 399 - Saginaw Bay: Much of the Bay's eastern shoreline provides opportunities for rock hounding, fossil collecting, and native culture study. Of special interest is Halleck Harbor where a gently sloping sand beach, a protected anchorage, and Indian pictographs attract visitors by boat. Waterfowl hunting occurs at the head of the Bay. One outfitter/guide permit has been issued in Saginaw Bay and is subject to annual renewal.

Opportunities exist for future trail development to Cool Lake and Ledge Lake, allowing easier access for stream and lake fishing. In addition, an existing fish passage on Dean Creek may encourage future use.

VCU 400 - Security Bay: Recreational use is generally water-oriented. Secure anchorages exist at numerous points along the Bay's shoreline. Excellent waterfowl hunting occurs at the head of the Bay. The State of Alaska has designated many of the large islands and parts of the eastern shoreline as a State Marine Park, with the purpose to maintain the area's traditional/aesthetic values. Marine Park facilities may be developed in the future, which would include mooring buoys and a floating dock.

*Bay of Pillars, A Popular  
Recreation Spot on Kuiu*



VCU 401 - Washington Bay: Much of the land in VCU 401 is steep and inaccessible, confining most recreational activities to Washington Bay. Washington Bay offers protected waters for boaters, excellent scenery due to the area's topography, and an old herring reduction plant.

VCU 402 - Rowan Bay: Rowan Bay is the location of the Island's only population center, an operating logging camp. Inland access is possible from Rowan Bay via the internal road system from the existing log transfer facility. Hunting and sport fishing occur in the estuary. Boaters frequently anchor in a small cove on the south shoreline near the mouth of the Bay. Planned recreation developments include a short trail from the residential center to a few scattered picnic sites along the shoreline, and placement of several tables along Forest Road 6404.

VCU 403 - Bay of Pillars: VCU 403 offers canoeing/kayaking, and boating opportunities abound. The Bay of Pillars Portage Trail (0.8 mile) connects Port Camden with the Bay of Pillars, providing one access route to the Tebenkof Bay Wilderness from the eastern side of Kuiu Island. A secure anchorage is found adjacent to an old cannery site northeast of Point Ellis. Current construction of a fish ladder along Kwatahein Creek may encourage future use. Planned recreation developments include the construction of a three-sided shelter near the Bay's mouth, and a new portage trail on Kutlaku Creek, providing access to Kutlaku Lake.

VCU 405.1 - Alecks Lake: Current use is generally limited to the Alecks Creek Portage Trail, providing kayakers access to the Tebenkof Bay Wilderness Area from the eastern side of Kuiu Island.

VCU 416 - Alvin/Reid Bays: Uncommon southeast facing sand beaches provide excellent opportunities for beachcombing activities; however, current use is minimal. Two anchorages are recognized, one near the head of Alvin Bay, and the other at the extreme southern tip of Reid Bay.

VCU 417 - No Name Bay: Canoe/kayak routes have been identified within No Name Bay. In addition, a segment of the Alecks Creek Portage Trail (1 mile) provides canoe/kayak access to the adjacent Tebenkof Bay Wilderness Area. Dispersed camping occurs near the Alecks Creek trailhead. Boaters find a safe anchorage along the southern shoreline. One outfitter/guide operates on a special use permit in No Name Bay, subject to annual renewal.

VCU 418 - Seclusion Harbor: Seclusion Harbor and the adjacent Salt Lagoon are stopover points for canoeists and kayakers. An anchorage is found near the Lagoon's entrance. Bear hunting and sport fishing are also popular in this area. Development plans include the possible construction of a recreation cabin.

VCU 419 - Threemile Arm: Recreation opportunities are generally confined to the head of the bay; however, some bird hunting does occur in a prominent estuary along the northeastern shoreline. A section of the Threemile Arm Portage Trail (1 mile) provides access to Threemile Arm from Port Camden. An anchorage exist about 1.25 miles southeast of the trailhead. This portage, in conjunction with the Bay of Pillars Trail, is used as a canoe/kayak access route to the Tebenkof Bay Wilderness Area. Threemile Arm is also the destination of a shorter canoe/kayak route from Kake via Rocky Pass.

VCU 420 - Port Camden: Several good anchorages are possible along the eastern shoreline of Port Camden, especially near the island complex west of Slippery Creek. Known shoreline occurrences of petrified material, including fossils of tree species no longer indigenous to Alaska, are also of special scientific interest. The head of Port Camden offers bear and waterfowl hunting opportunities as well as a route into the Bay of Pillars via the Bay of Pillars Portage Trail (0.4 mile constructed in this VCU). Dispersed camping occurs near the Bay of Pillars trailhead in VCU 420. Future recreational use may be influenced by the current development of the Slippery Creek Fishpass.



VCU 421 - Kadake Bay: Excellent steelhead, trout, and salmon fishing is found in the waters of Kadake Creek. Bear and waterfowl hunting occur throughout the Bay. Much of the recreational use of Kadake Bay is associated with an existing recreation cabin. Boat anchorages occur near the Bay entrance or at Gill Harbor. Gill Harbor also contains an excellent salmon fishery. Future plans include the possible construction of a trail from Forest Road 6415 to the headwaters of Kadake Creek, providing better fishing access. One special use outfitter/guide permit has been issued for Kadake Bay, and is subject to annual renewal.

VCUs 427/428 - Rocky Pass: Recreation use in Rocky Pass centers around canoeing, kayaking, and the Forest Service recreation cabin at Devils Elbow. Rocky Pass itself is difficult for large boats to navigate, thus restricting saltwater access to small craft. Opportunities for waterfowl and black bear hunting exist along the shoreline. Sections of these VCUs also contain rock outcrops with fossil remains that are of geologic/scientific interest.

## Visual Resources

North Kuiu Island is surrounded by three marine travel routes: Chatham Strait to the west, Frederick Sound to the north and Keku Straits/Rocky Pass to the east. Chatham Strait and Frederick Sound are well traveled and are of highest visual sensitivity. Keku Strait and Rocky Pass are less frequently traveled and are of moderate visual sensitivity.

In order to understand the visual resource inventory and management on the Forest, definitions for the following terms are useful.

The **Existing Visual Condition (EVC)** is an inventory that rates the level of visual quality or conditions that presently exist. The EVC ratings may range from Type I, where little or no human modification is apparent, to Type VI, where man-made changes in the landscape are in contrast to the natural landscape (see Glossary). The acreages by VCU in each Existing Visual Condition class are displayed in Table 3-28. Generally, 74.4 percent of the analysis area exists in a natural condition (EVC Type I), while 21.8 percent is in a heavily altered condition (EVC Type V). The remaining 3.7 percent is in a slightly to moderately altered condition (EVC Type II-IV).

**Visual Quality Objectives (VQOs)** are visual resource management goals for National Forest System lands. They are based upon the variety in the landscape, the distance between the landscape and the persons viewing it, and how much the landscape is viewed by people. The VQOs applicable to Analysis Area 12 are: Retention, Partial Retention, Modification, and Maximum Modification. They are defined in the glossary.

Inventory VQOs provide a baseline from which to measure changes, for use in managing National Forest lands. The Inventory VQOs are based upon the variety in the landscape, the distance between the landscape and the viewers, and how much the landscape is viewed. As part of the visual inventory, Sensitivity Levels were mapped, completing the VQO mapping on the Tongass National Forest. The Sensitivity Level map was approved by the Regional Forester, John Sandor, in 1980. See the glossary for a definition of Sensitivity Levels. The Sensitivity Level map provides the basis for the Inventory VQOs and visual quality management on the Forest. VQOs for Analysis Area 12 are presented in Table 3-29.

Since TLMP was completed in 1979, prior to implementation of the Visual Management System on the Forest, VQOs were not assigned to specific sites in that document. TLMP did, however, delineate Land Use Designation (LUD) classes, designating emphasis in some areas for amenity values, and others to commodity values. To be responsive to TLMP in this document, a general rule was developed using the Land Use Designation (LUD) classes: in areas classified LUD III, where amenity values are to be emphasized, change from the Inventory VQOs should be minimal; in areas classified LUD IV, where commodity values are emphasized, changes in Inventory VQOs are allowed greater flexibility to meet the intent of TLMP. All of Analysis Area 12 is classified LUD IV.

### 3 Affected Environment

*Decksider Viewing from an Alaska State Ferry*



Table 3-28  
Existing Visual Condition (EVC) in Acres<sup>1</sup>

VCU	EVC Classes (Type)					
	I	II	III	IV	V	VI
398	6,344	184	0	1,064	1,913	0
399	10,587	294	871	181	12,686	0
400	17,119	39	41	1,783	9,507	0
401	13,772	0	105	0	0	0
402	16,577	0	215	1,293	14,537	0
403	26,874	51	1,013	0	1,944	0
405.1	1,651	0	0	0	0	0
416	16,764	627	268	58	272	0
417	11,023	0	0	0	1,540	0
418	9,335	0	0	403	47	0
419	12,005	261	0	869	6,304	0
420	31,061	29	192	771	1,610	0
421	19,270	0	0	416	14,457	0
427	5,078	0	0	232	0	0
428	24,096	21	0	0	0	0
Total	221,556	1,506	2,705	7,070	64,817	0

SOURCE: GIS database, Stikine Area Supervisor's Office, Petersburg, AK.

<sup>1</sup> EVCs range from Type I for the most natural appearing views, to Type VI, where man-made changes are grossly obvious and do not blend with the natural scenery. See the Glossary for detailed definitions of each class.

Table 3-29

**Inventory Visual Quality Objectives in Acres**

VCU	Retention	Partial Retention	Modification	Maximum Modification
398	75	258	1,287	7,884
399	101	3,917	5,385	14,584
400	849	1,845	13,378	11,968
401	0	7,128	6,748	0
402	201	2,872	9,163	19,156
403	0	12,047	12,290	5,546
405.1	0	578	83	990
416	459	3,651	8,744	5,135
417	400	2,240	4,942	4,953
418	786	2,756	3,014	4,210
419	72	5,610	7,058	6,666
420	50	6,674	11,768	15,463
421	20	3,889	3,244	26,459
427	1,139	1,533	154	2,485
428	1	3,440	9,207	11,470
Total	4,153	58,438	96,465	136,969

SOURCE: GIS database, Stikine Area, Supervisor's Office, Petersburg, AK.

Following is a description of the existing visual setting of each VCU in Analysis Area 12.

Saginaw Bay (VCU 399) and Rowan Bay (VCU 402) are of moderate visual sensitivity. Timber harvest activities and the Rowan Bay logging camp dominate the visual setting of these two VCUs.

Security Bay (VCU 400) is of high visual sensitivity, reflecting the State of Alaska Marine Park located on the east side of the Bay, the private residence adjacent to the Marine Park, as well as its use by recreational and commercial fishing operations. The landscapes associated with these areas consist of rolling terrain with topographic relief varying from 1,000 to 3,000 feet. The area is largely covered with hemlock/spruce forests, with mountains and summits serving as focal points.

The landforms adjacent to Keku Strait (VCU 398) are low-lying and visually dominated by the Keku Islets scattered along the shoreline out to approximately 4 miles from shore. These islets define the Keku Straits, and provide spatial variety as the traveler moves through the area. When viewed in conjunction with the rugged background mountains of Admiralty and Baranof Islands, these islets offer spectacular scenery for the recreationist and marine traveler. Areas seen from Kadake Bay (VCU 421) are of high visual sensitivity and are visible within 0.5 mile by persons approaching the Kadake Bay Forest Service recreation cabin.

The Washington Bay area (VCU 401) is viewed from Chatham Strait by passing cruise ships and commercial fishing vessels. Landforms associated with this area rise steeply from saltwater, providing a dominant profile seen in the middle-ground distance zone. Washington Bay provides a safe anchorage during inclement weather, yet receives little use, as weather conditions may prevent safe access to the bay.

The Bay of Pillars (VCU 403) provides three distinct landscapes: the north shore, south arm, and inner bay areas. The north shore consists of small islands and irregular topography. The



inner bay and the peaks surrounding it are visible from the north shore. The south arm of the inner bay provides access to Kutlaku Lake, Kutlaku Creek, and scenic alpine areas to the southeast. The “gut” accessing the inner bay is extremely scenic since the area is viewed within close proximity of the traveler. Landscapes adjacent to Alecks Lake (VCU 405.1) are gently rolling, seen as middle ground from Alecks Lake.

East Kuiu Island (VCUs 416, 417, 418, and 419) receives light use by recreationists as well as subsistence hunters. The landscape character in this area is similar to that found elsewhere in Southeast Alaska. Previous logging activities are evident in Alvin Bay (VCU 416), No Name Bay (VCU 417), and Threemile Arm (VCU 419). Seclusion Harbor (VCU 418) is a protected bay with a good anchorage and provides access to the Salt Lagoon (rated high visual sensitivity), which is a unique example of a salt chuck.

Port Camden (VCU 420) is predominantly used by commercial crab fishing operations as well as subsistence users originating from Kake. Canoe portages have been constructed by the Forest Service, providing access from Threemile Arm to Port Camden and from Port Camden to Bay of Pillars.

The Keku Strait/Rocky Pass area (VCUs 427 and 428) is low lying in character with beach fringe as the dominant visual element. Most use occurs to the north, where Kake residents access the Big John Bay Forest Service recreation cabin or Port Camden for subsistence purposes. The landscape character of Rocky Pass provides the viewer outstanding variety and scenery. Numerous small islands dominate the vista, with low lying, adjacent landforms of Kuiu and Kupreanof Islands as background. Navigational aids in Rocky Pass were removed by the US Coast Guard during the summer of 1983. Since then recreation use levels have dropped off considerably.

*Scenic Roaded Landscape*





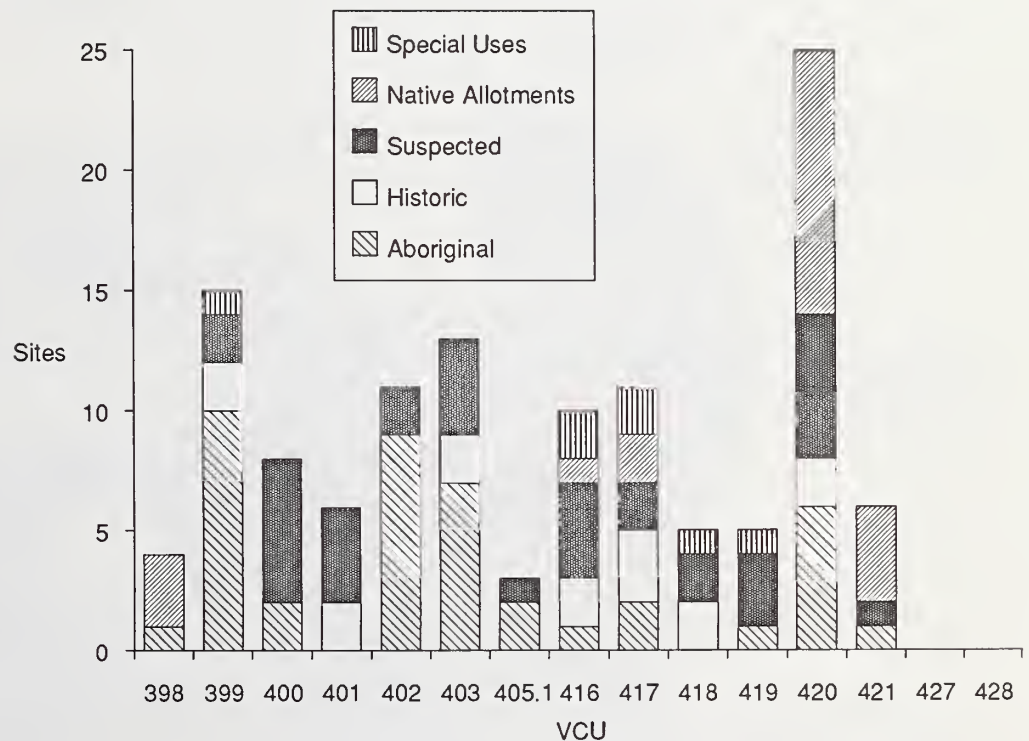
## Cultural Resources

Cultural resources include the evidence of past human activity, potentially dating from the first occupation of Southeast Alaska to the recent past. Information on the prehistory of the region is limited, and Kuiu Island is poorly known. Some sites in the region, including the Ground Hog Bay site on the Chilkat Peninsula and the Hidden Falls site on Baranof Island, indicate that the occupation of Southeast Alaska dates to nearly 10,000 years ago.

At the time of Euroamerican contact, the Kake and Klawock Tlingit used the northern and southern portions of Kuiu Island, respectively. Villages and sites for seasonal hunting, fishing, and collecting activities were located throughout the area. Recent historical activities in the area have included commercial fishing and canneries, fur farming, logging, limited hydroelectric power development, and some mineral exploration.

Reconnaissance-level cultural resource surveys have been carried out on Kuiu Island, related primarily to Forest Service activities. Information about known sites is contained in the Planning Record. However, these records are generally not available to the public because of the sensitivity of cultural resource sites. Sealaska Corporation contracted for an archeological-historical survey of the region to locate historical and cemetery sites for selection under Section 14(h)(1) of the Alaska Native Claims Settlement Act (ANCSA). Sealaska selected several sites on Kuiu Island. Figure 3-7 shows the types of known and reported sites of cultural resources for Analysis Area 12 VCUs. Aboriginal sites include villages, middens, camps, weirs, cemeteries, forts, portages, pitch-cut trees, and petroglyphs, while historical sites include cabins, camps, hatcheries, fur farms, and canneries.

Figure 3-7  
**Kuiu Island Cultural Resource Sites**



SOURCE: SEIS Planning Record.



## Paleontological Resources

Fossilized plant remains are found in the northern and northeastern portions of Kuiu Island, including bald cypress (*Taxodium dubium*), redwood (*Sequoia langsdorfii*), chestnut (*Castanea castaneaefolia*), hazelnut (*Corylus maquarii*), planer tree (*Planera ungerii*), and fern (*Osmunda doroschkiana*) (Banta 1961). US Geological Survey staff have indicated that the area between Port Camden and Keku Strait (VCUs 419, 420, 427, and 428) is an important locality for fossil logs and leaves (Brew 1987).

## Socioeconomics

The socioeconomic environment affected by the proposed action includes the communities within or adjacent to the Analysis Area, the communities with forest products production facilities that use the timber, and the communities whose residents visit the Analysis Area to hunt, fish, or pursue recreation. The communities near Analysis Area 12 include Angoon, Hoonah, Kake, Point Baker, Port Alexander, Port Protection, Sitka, and Tenakee Springs. Communities with forest products production facilities that use timber from the APC Long-Term Sale include Wrangell and Sitka. Finally, Haines, Sitka, Juneau, Petersburg, and Ketchikan supply a limited number of hunters, anglers, and recreationalists who use Analysis Area 12 on Kuiu Island.

As a group, these communities form the larger part of what the State of Alaska Department of Labor refers to as Southeast Alaska or the Southeast Region. In general, employment, personal earnings, and the well-being of the population in the individual communities follows the rise and fall of economic activity in the Southeast Region as a whole.

## Regional Economy

The output of the Alaskan economy is dominated by the foreign export of fishery and forestry products, the sale of North Slope oil, and the accommodation of foreign and US visitors (Figure 3-8). Heavy dependence on global macroeconomic conditions increases the amplitude of the cyclical swings in employment relative to the rest of the US and heightens the anxiety and concern of local residents. The private sector in Southeast Alaska is dominated by fishery and forestry exports, tourism, and the accommodation of visitors, including anglers and hunters.

Local Seiner, Kake, Alaska

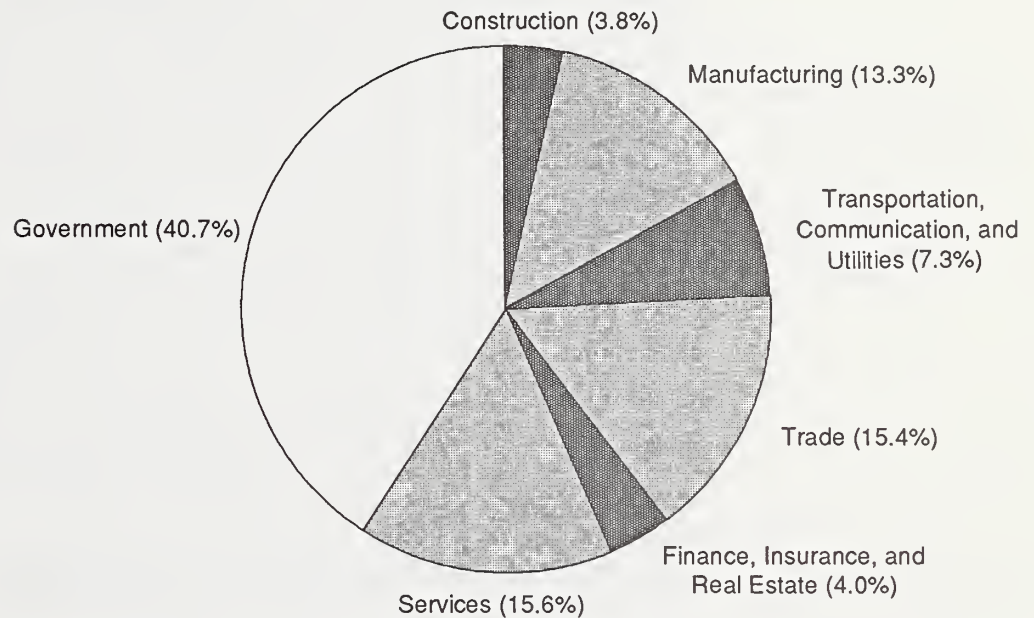




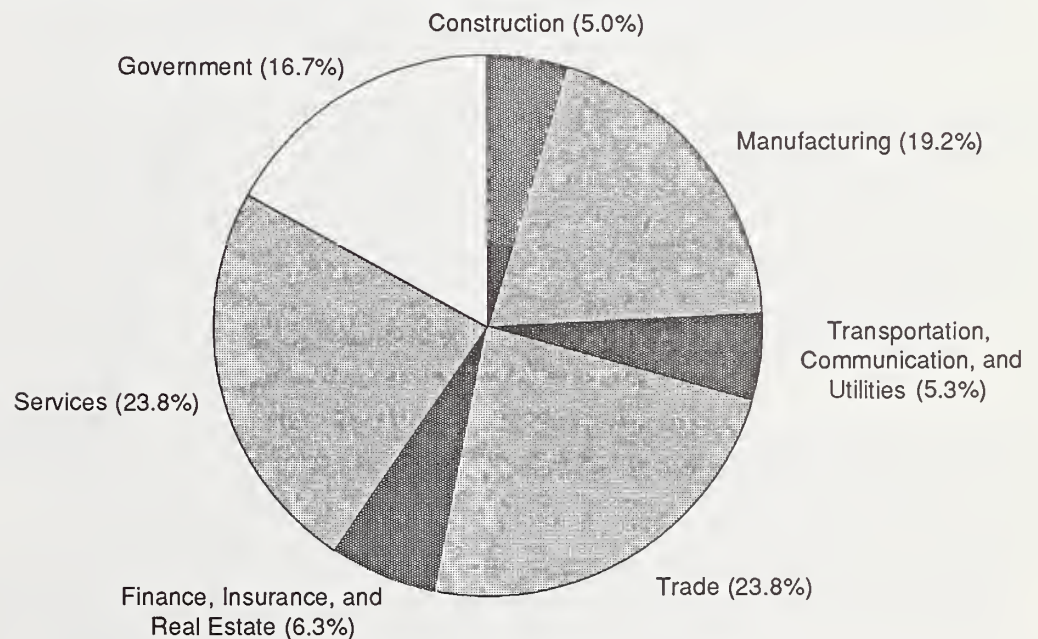
Figure 3-8

# Employment in Southeast Alaska Compared to Total US Employment

## Southeast Alaska



## United States



SOURCE: 1986 employment data from Alaska Department of Labor, Research Analysis Section. 1987. Statistical Quarterly, Fourth Quarter, 1986. Computations by EIS staff.

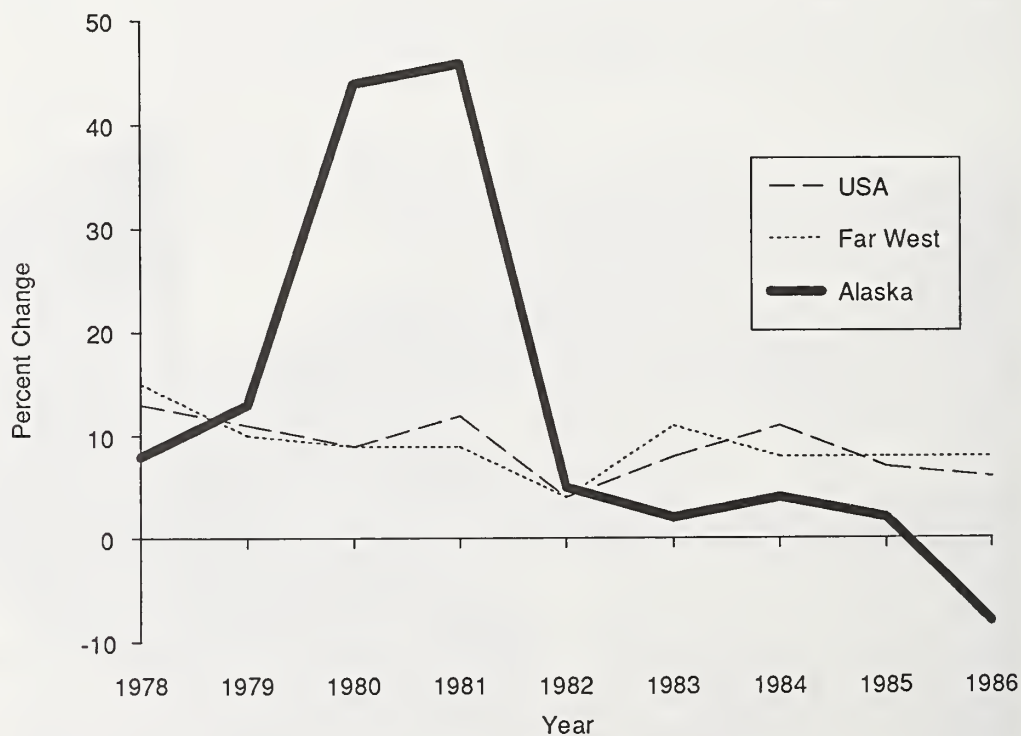
The public sector has a significant presence in the region. State and local government employment is heavily influenced by the level of oil royalties returned to the State from Federal leases of off-shore tracts. With the capital of Alaska in Juneau, the effects of changes in employment and earnings in state and local government are pronounced.

The dollar value of total output of goods and services from Alaska in 1986 was \$19.6 billion. Merchandise comprised \$1.3 billion or 6.6 percent of this output (US Dept. of Commerce 1988). By comparison, the total US output in 1986 was valued at \$4.2 trillion, merchandise exports were \$227 million or 5.4 percent. In value, Alaska's trade in 1986 was led by fishery products (38.4 percent), oil and gas (22.6 percent), and wood products (19.9 percent). As mentioned, the dependence on export of natural resources makes Alaska and the Southeast Region vulnerable to global economic events. For example, Figure 3-9 shows Gross State Product for the USA, the Far West (California, Nevada, Oregon, Washington, Alaska, and Hawaii), and Alaska as defined by the US Department of Commerce, Bureau of Economic Analysis. The percent change from year to year is calculated. The reaction of the Alaskan economy to the rise in oil prices from 1978-1982 is apparent, as the value of Alaska's economic output grew faster than that of the US or the Far West. In 1983, the sharply rising dollar began cutting deeply into the competitiveness of Alaskan exports of natural resources. By 1985 the precipitous fall in the price of crude oil and the rise in the value of the dollar decimated Alaskan exports, and the Gross State Product contracted.

The sensitivity of the economy to foreign markets is also seen in Figure 3-10, which shows the consistent relationship between the quantity of Alaskan exports of forest products and

Figure 3-9

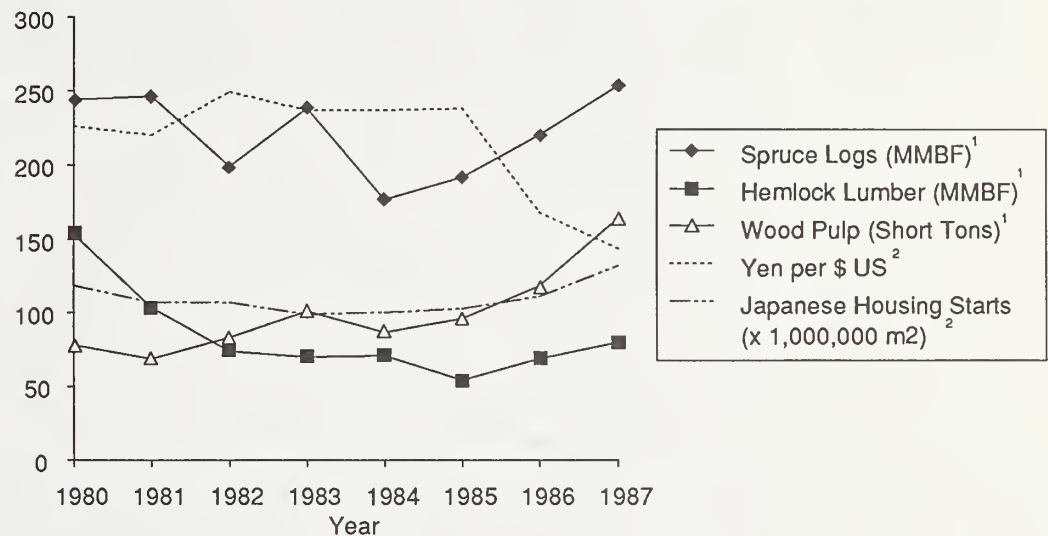
## Change in Gross State Product for Alaska and USA, 1978-1986



SOURCE: Survey of Current Business, Vol. 68, No. 5, May 1988, US Department of Commerce, Bureau of Economic Analysis.

Figure 3-10

### Selected Alaskan Exports of Forest Products, 1980-1987



<sup>1</sup> Data obtained from US Department of Commerce database, Washington, D.C..

<sup>2</sup> Data obtained from Pacific Rim Log Market Reports, published by J. Greenfeld, A.C.F. and Associates, Seattle, WA.

indicators of the strength of the Japanese economy. Japan is the principal destination for Alaska's exports of forest products. As wood-using activity increases in Japan, Alaskan exports increase. Similarly, as the relative purchasing power of the Japanese increases (yen/dollar goes down) and the cost of Alaskan products declines (yen/dollar down), the quantity of Alaska's exports increases.

The dependence of the region's economy on foreign demand, primarily for seafood products, forest products, and tourism, is widely understood in the local communities. This economic vulnerability heightens the desire both to broaden the base of economic activity and to stabilize the existing jobs through a continuity of resource supply. Although the employment fluctuation extends over the business cycle, communities experience greater change based on their economic orientation. For example, with its base in government, Juneau experiences little annual variation. Sitka, with employment led by the pulp mill, experiences slightly more annual change. In several of the other census areas, however, communities focused on logging and fishing face more change (Figure 3-11).

## Population

While population in the region has increased steadily with the growth in economic activity in Alaska (Table 3-30), the Southeast Region remains sparsely populated. Juneau grew at about the same rate as the State, while Southeast Alaska grew at slightly more than half the rate of the State and its capital. Among the areas affected by the proposed action, population in the Prince of Wales-Outer Ketchikan Census Area, Angoon, Hoonah, and Kake grew principally as a result of increased timber harvest and road construction activity. Growth in Gustavus came from increased tourism to Glacier Bay National Park. Elfin Cove, Pelican, and Port Alexander grew based on expanded fishing.

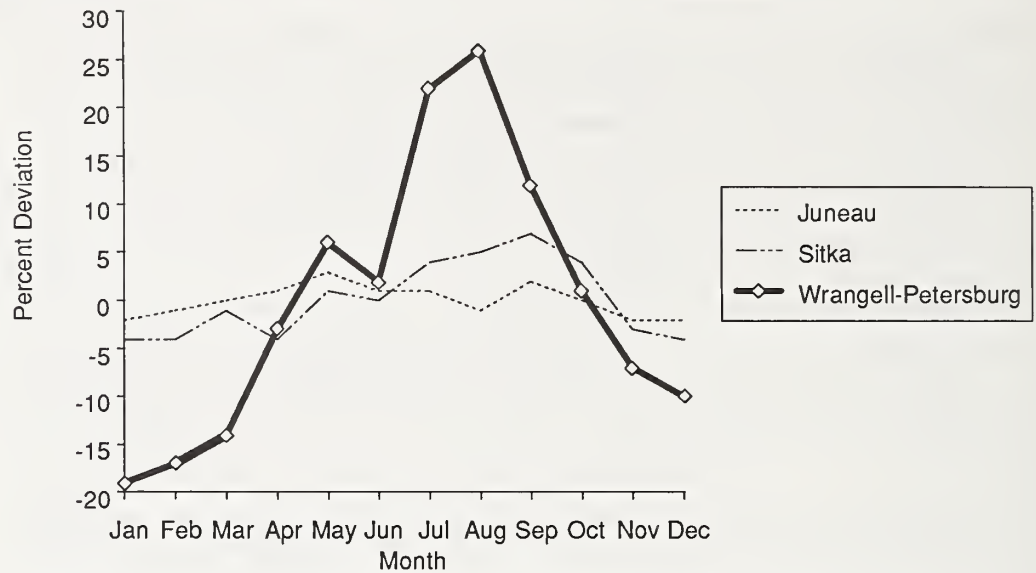
## Employment

With its historical basis on natural resources, Alaska's economy has experienced the mixed blessing of high wages based on labor shortage along with high levels of unemployment in rural communities (Figure 3-12). In an effort to bolster economic development by expanding



Figure 3-11

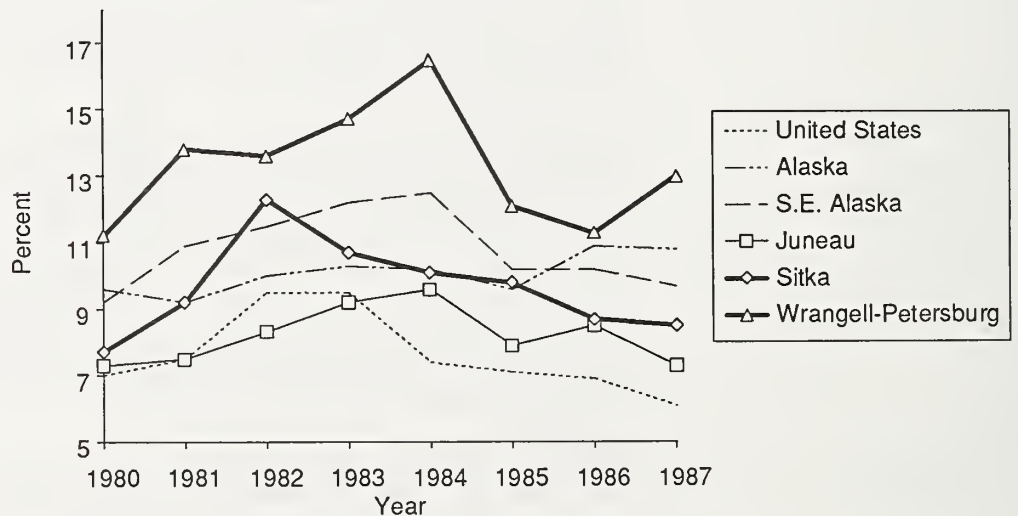
## Seasonality of Selected Southeast Alaska Employment, 1987



SOURCE: Alaska Department of Labor, Research and Analysis Section. 1987. Statistical Quarterly, Fourth Quarter.

Figure 3-12

## Unemployment Rates, 1980-1987



SOURCE: US - Economic Report to the President, February 1988, Table B-39, p.292, Government Printing Office, Washington, D.C..

Alaska - 1980-1984 data: Alaska Planning Information, Alaska Department of Labor, Research and Analysis Section, February, 1986, pp. 24-25.

1985-1987 data: Alaska Economic Trends, March 1988, p. 19, Alaska Department of Labor, Research and Analysis Section.

SE Alaska & Census Areas - 1980-1984 data: Alaska Economic Trends, April 1986, p.32.

1985-1986 data: Alaska Economic Trends, March, 1987, pp.10-11.

Table 3-30

**Population Change in Southeast Region in 1980 and 1986**

Location	Provisional Census July 1, 1986	Official Census April 1, 1980	Change	Average Annual Percent Growth
State of Alaska	547,600	401,851	145,749	6
Southeast Region	64,437	53,794	10,643	3
Haines Borough	1,881	1,680	201	2
Juneau Borough	26,422	19,528	6,894	6
Ketchikan Gateway Borough	12,436	11,316	1,120	2
Prince of Wales/Outer Ketchikan Census Area	5,023	3,822	1,201	5
Sitka Borough	8,102	7,803	299	1
Skagway-Yakutat-Angoon Census Area	3,784	3,478	306	2
Angoon Census Subarea	781	712	69	2
Angoon City	605	465	140	5
Tenakee Springs City	125	138	-13	-2
Balance of Subarea	51	109	-58	-9
Hoonah-Yakutat Subarea	2,078	1,817	261	2
Elfin Cove	46	28	18	11
Gustavus	211	98	113	19
Hoonah City	895	680	215	5
Pelican City	270	180	90	8
Wrangell-Petersburg Census Area	6,789	6,167	622	2
Petersburg Subarea	4,248	3,804	444	2
Kake City	665	555	110	3
Petersburg City	3,182	2,821	361	3
Port Alexander City	128	86	42	8
Wrangell Subarea	2,402	2,184	178	1

Source: Alaska Department of Labor, Research and Analysis Section, Demographic Unit, October 15, 1988.

infrastructure, the State of Alaska launched numerous construction projects as oil revenues swelled in the late 1970s and early 1980s. The expansive State spending fueled growth in jobs, population, and incomes in Alaska from 1980 through 1985; during those five years, the number of wage and salary jobs in the State grew 35 percent, population 30 percent, and total personal income 70 percent (Goldsmith 1987). By contrast, the US population grew 5 percent, wage and salary employment increased 8 percent, and personal income only 47 percent.

Contraction in the State's oil revenues and the high rate of exchange between the US dollar and the Japanese yen resulted in a statewide recession between 1985 and 1987. In 1987, Alaska ranked number one among the states in the percentage of unemployed who were unemployed because they lost their jobs: 57.1 percent of the total unemployed (ranked first in the country), 70.4 percent of male unemployed (1st), and 37.8 percent of female unemployed



(12th). In 1987, Alaska ranked seventh in the percentage of the workers who were unemployed for a period of 15 weeks or more (33.4 percent). Particularly hard hit were the construction, transportation, and manufacturing sectors.

## Economic Uses of the Forest

Timber harvest directly impacts several economic sectors including heavy construction, lumber and pulp products, and water transportation (Table 3-31). Employment in the commercial fishing sector is shown separately (Figure 3-13). The average annual value (exvessel value) of salmon produced in Analysis Area 12 has been estimated at \$647,000 (Figure 3-14). The production of pink and chum salmon contributes 90 percent of this value and coho production contributes 10 percent. Streams in VCUs 421, 402, and 400 are most important, in that they contribute 49 percent of the total value. Additional economic value is also derived from recreational fisheries for steelhead and cutthroat trout. Sport fishing as well as sport and subsistence hunting affect sales, earnings, and employment in the retail trade and service sectors. Guided black-bear hunting also takes place in Analysis Area 12 (Chapter 3, Wildlife Section), but it is not a major economic activity.



Table 3-31

**Southeast Alaska Employment from 1981 to 1987<sup>1</sup>**

Industry	1981	1982	1983	1984	1985	1986	1987
Nonagricultural Wage & Salary	26,995	27,705	28,483	28,661	29,190	29,035	28,600
Construction	1,404	1,514	2,017	1,814	1,665	1,098	1,100
Building Construction	395	420	548	528	497	329	
Heavy Construction	627	655	820	531	491	334	
Special Trades	382	440	649	755	677	436	
Manufacturing	3,884	2,861	3,355	3,008	3,236	3,854	4,100
Food & Kindred Products <sup>2</sup>	1,125	1,092	908	871	996	1,160	1,100
Lumber & Paper Products <sup>3</sup>	2,576	2,589	2,255	1,946	2,039	2,491	2,800
Other Manufacturing	183	180	192	191	201	203	200
Transportation, Comm., & Utilities	2,506	2,238	2,025	1,950	2,032	2,107	2,100
Water Transportation	542	447	486	452	470	464	
Air Transportation	760	634	492	469	469	526	
Trade	3,847	4,167	4,406	4,576	4,552	4,465	4,500
Wholesale	300	334	438	384	370	335	400
Retail	3,547	3,834	3,968	4,193	4,183	4,130	4,100
Food Stores	704	797	842	838	845	836	
Eat & Drink	1,152	1,245	1,247	1,243	1,342	1,405	
Other Retail Trade	1,691	1,792	1,879	2,112	1,996	1,889	
Finance, Insurance, & Real Estate	1,088	957	992	1,037	1,105	1,164	1,100
Mining, Services & Miscellaneous	3,409	3,850	4,297	4,521	4,488	4,520	4,600
Hotel, Motel	527	592	730	775	801	721	
Medical Services	613	674	744	775	782	862	
Other	2,269	2,584	2,823	2,971	2,905	2,932	
Government	10,857	11,119	11,390	11,754	12,113	11,826	11,000
Federal	2,345	2,216	2,163	2,087	2,085	2,084	1,900
State	5,001	5,313	5,407	5,476	5,520	5,394	5,000
Local	3,512	3,591	3,820	4,191	4,508	4,348	4,100

SOURCE: Alaska Department of Labor, Research and Analysis Section, 1988. Report of Employment and Wages, ES-202.

<sup>1</sup> For nonagricultural wage and salary employment only. These numbers represent a "job count" and do not distinguish between full and part-time employment. The employment figures do not include self employed persons, unpaid family help, domestics, most persons engaged in commercial fish harvesting and agriculture, and military employment.

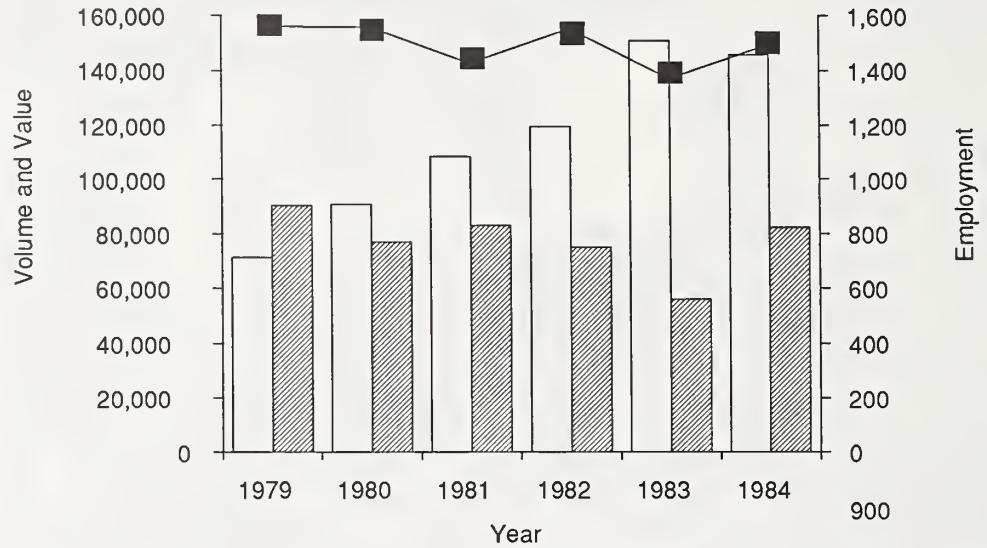
<sup>2</sup> Seafood processing.

<sup>3</sup> Includes logging, sawmill and pulpmill employment.

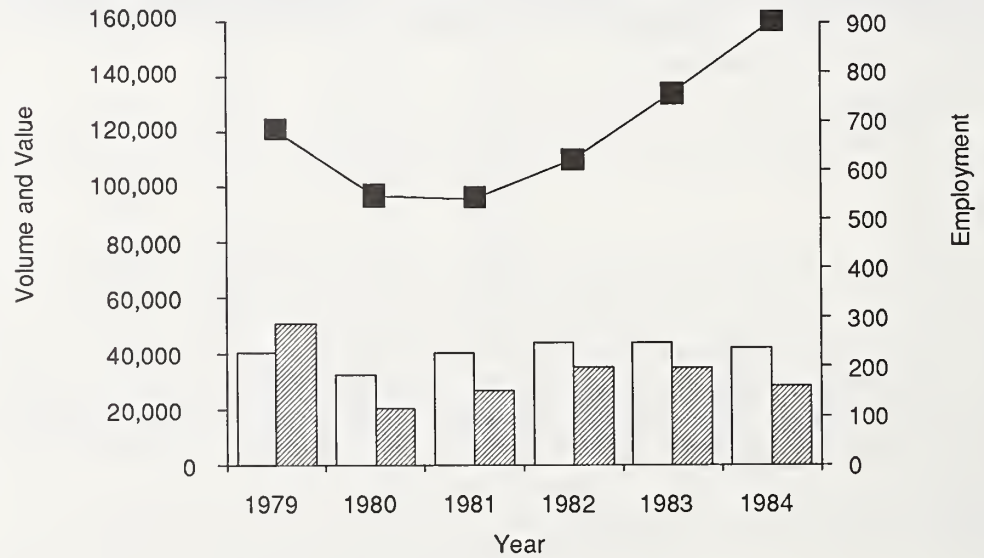
Figure 3-13

## Fishery Employment in Southeast Alaska, 1979-1984

### Salmon Fishery



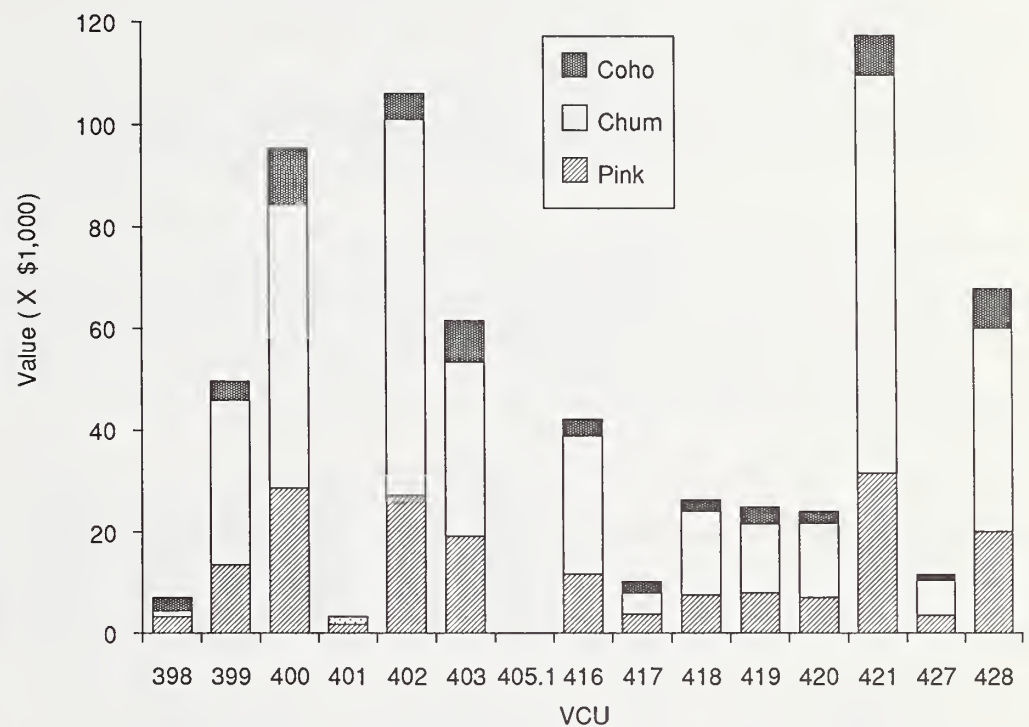
### Other Fisheries



□ Volume ( X 1,000 lbs)  
 ▨ Ex-Vessel Value ( X \$1,000 )  
 ■ Employment

SOURCE: Thomas, K. 1987. Alaska Seafood Industry Employment 1977-1984. Alaska Department of Labor, Research and Analysis Section. pp 11-29.

Figure 3-14  
**Estimated Average Annual Value of Salmon Produced in Analysis Area 12**



SOURCE: Based on data from Holstine and Colltzi (1984).

*Ship Being Loaded,  
APC Pulp Plant*





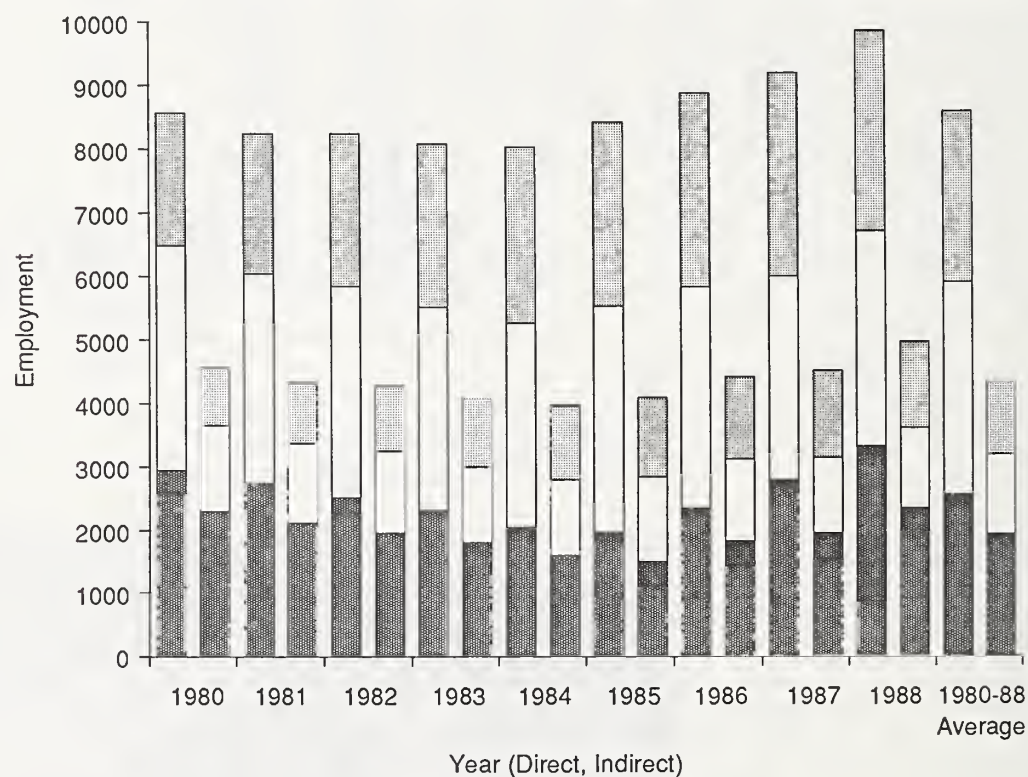
Figure 3-15 shows how employment depends on resource utilization and visitor accommodation in Southeast Alaska. These figures include employment supported by business expenditures in the resource industries (indirect) and the personal consumption expenditures of employees in the resource industries (induced). In total, direct employment in forest products, fishing, and visitor accommodation accounts for approximately 30 percent of the total wage and salary employment in Southeast Alaska.

## Timber Harvest

From 1980 through 1988, timber harvest and forest products manufacturing supported an average of 4,481 jobs in Southeast Alaska (Figure 3-16). During this period approximately 60 percent of the timber processed in Southeast Alaska came from land administered by the

Figure 3-15

## Direct and Indirect Employment in Forest Products, Fishing, Fish Processing, Tourism and Resident Recreation, 1980-1988



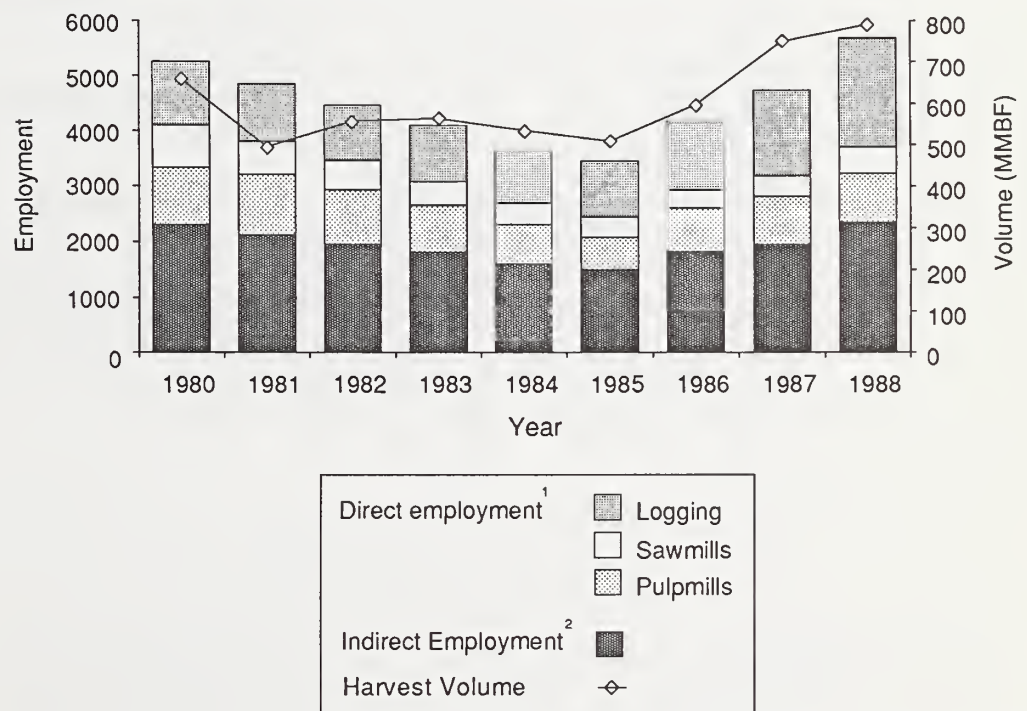
SOURCE: Status of the Tongass National Forest, 1987 Report. ANILCA 706(b), Report No. 2, USDA Forest Service, Alaska Region, MB 35, March 1988. Chapter 2, pg. 20.

Forest Service (Figure 3-17). All softwood log exports (except cedar) originated on private or State lands as a result of federal requirements for primary processing. Given the volumes reported on harvest (Figure 3-17) and export (Figure 3-18) of softwood logs, most of the sawlog volume harvested from private land has been exported. Assuming that low-grade logs on private lands are sold as pulp logs and are harvested in about the same proportion as the utility harvest reported on the Tongass National Forest (12.4 percent), harvest from the Tongass National Forest supports 60 percent of the logging employment, all of the sawmilling employment, and about 75 percent of the pulp mill employment in the region. The actual level varies from year to year based on harvest by ownership and the comparative strength of the export market. In the 1980s, forest products extraction provided 12 percent of the region's wage and salary employment with the timber from the Tongass supporting about 7 percent of the region's jobs.

Alaska Pulp Corporation (APC), situated in Sitka, is the principal user of timber harvested through the proposed action. Of the pulp shipped during 1986 by APC, 75 percent went to Japan. APC also exported pulp to Korea, Taiwan, China, Mexico, and Indonesia during 1986. The total value of APC exports in 1986 was \$50 million, 20 percent of the total value of forest product exports from Alaska, and 4 percent of the total value of all Alaskan exports. APC's 1987 pulp production increased 19 percent over 1986 levels, while the value of sales

Figure 3-16

### Lumber and Wood Products Industry Employment in Southeast Alaska, 1980-1988



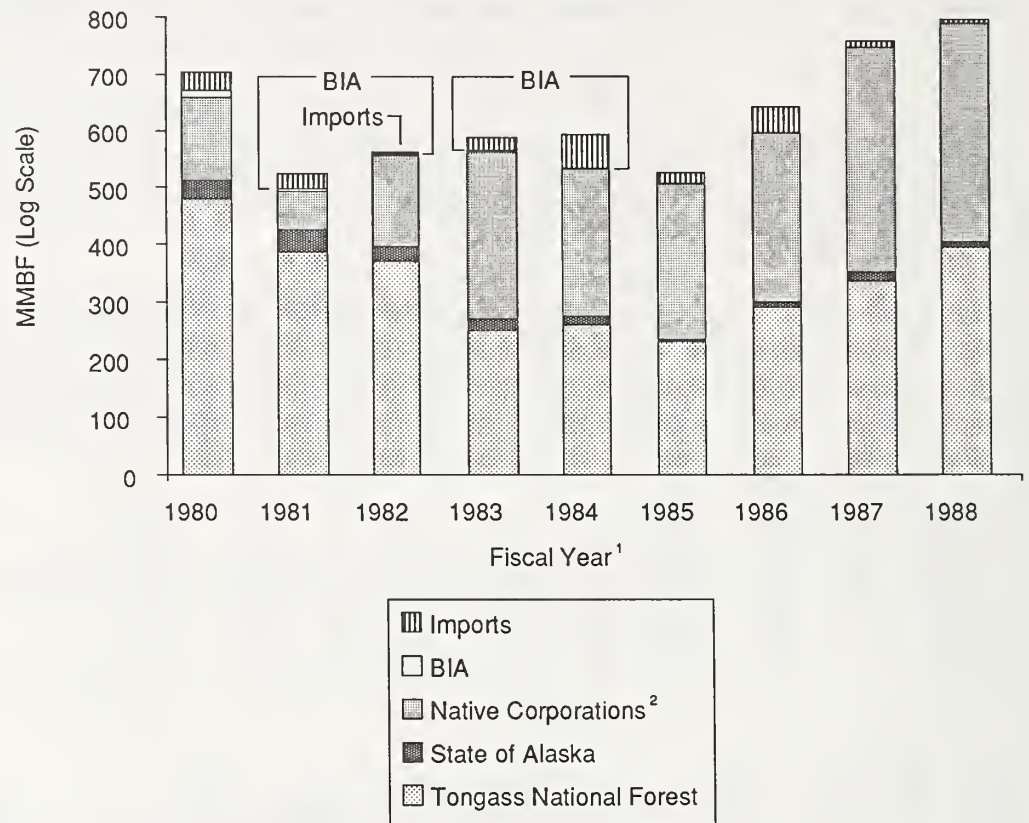
SOURCE: Timber Supply and Demand Draft 1988 Report ANILCA 706(a) Report No. 8. USDA Forest Service, Alaska Region, R10-MB-55.

<sup>1</sup> Alaska Department of Labor statistics subject to revision. Current as of February 9, 1989.

<sup>2</sup> Rounded to the nearest 25 jobs.

Figure 3-17

## Source of Timber Processed in Southeast Alaska



SOURCE: Timber Supply and Demand Draft 1988 Report, ANILCA 706(a) Report No. 8. USDA Forest Service, Alaska Region, R10-MB-55.

<sup>1</sup> The Federal Fiscal Year extends from October 1st to September 30th of the following year.

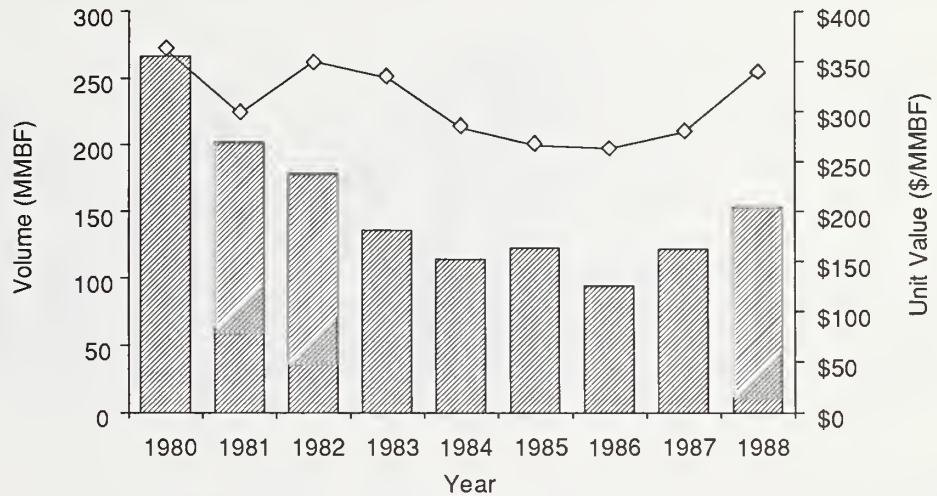
<sup>2</sup> Estimate. Sources were not found for certain years or ownerships and are not estimated (nc). Some of the private harvest reported in fiscal years 1982-86 for southeast Alaska originated from southcentral Alaska, but data were not available to separate the two regions from the estimated total.



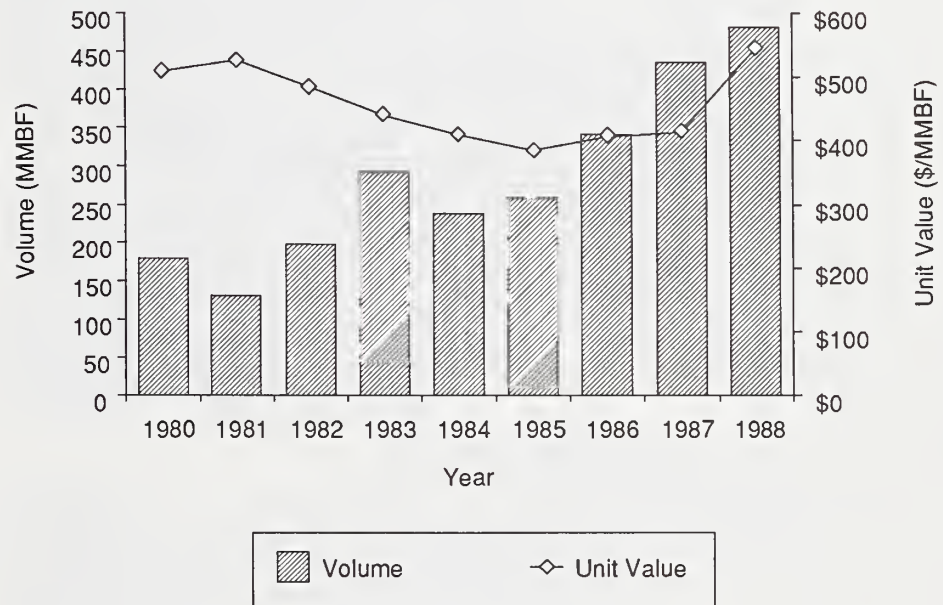
Figure 3-18a

## Forest Product Exports from Alaska to All Destinations

### Lumber and Cants



### Softwood Log



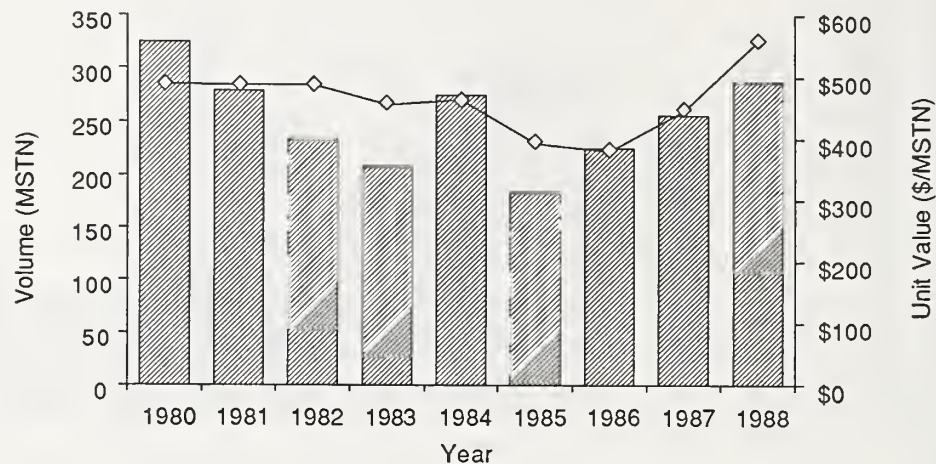
SOURCE: Timber Supply and Demand Report, 1987, ANILCA 706(a) Report No. 7. USDA Forest Service, Alaska Region, May 1988. Pg. 15.

NOTE: Volumes exported are in millions of board feet (MMBF) or thousands of short tons (MSTN). Values are free alongship (FAS) in thousands of nominal dollars. Unit values are dollars per unit.

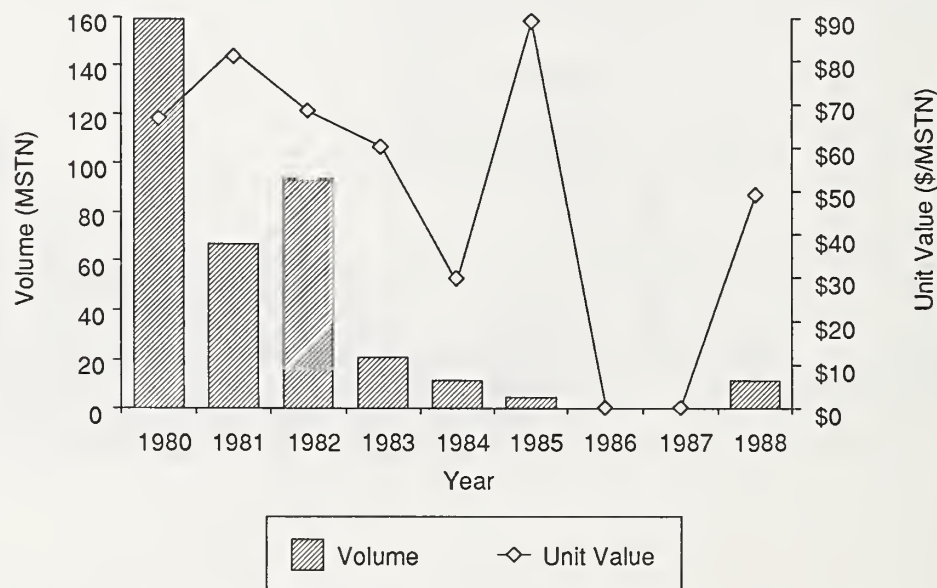
Figure 3-18b

## Forest Product Exports from Alaska to All Destinations

### Woodpulp



### Woodchips



SOURCE: Timber Supply and Demand Report, 1987, ANILCA 706(a) Report No. 7. USDA Forest Service, Alaska Region, May 1988. Pg. 15.

NOTE: Volumes exported are in millions of board feet (MMBF) or thousands of short tons (MSTN). Values are free alongship (FAS) in thousands of nominal dollars. Unit values are dollars per unit.

increased even more to \$80.5 million. The 1987 sales went to Japan (56 percent), Korea, Taiwan, Mexico, Egypt, Russia, Greece, Thailand, Hong Kong, and domestic markets.

During 1986, Alaska Pulp Corporation employed 391 workers in Sitka including 373 in pulp production and mill administration plus 18 longshoremen. The 373 mill workers accounted for 19.7 percent of Sitka's basic industry employment. When mill longshore labor is included, the pulp mill is responsible for 20.5 percent of basic industry employment in Sitka (McDowell Group 1988).

Payroll statistics reveal an even greater impact in Sitka's economy. APC's 1986 millworker payroll of \$13.7 million is 27.6 percent of Sitka's basic industry payroll. Adding longshoremen payroll (an estimated \$720,000), APC accounts for 28.6 percent of Sitka's total basic industry payroll and 17.5 percent of all Sitka area payroll. The average annual salary of APC workers is nearly 50 percent higher than the Sitka area average.

From employment data it is possible to estimate population impacts. Based on the employment/population ratio, APC directly accounts for an estimated 820 Sitka residents, 10 percent of the total Sitka area population. This estimate gives equal weight to all Sitka area basic industries in determining population impacts. It is likely that the APC impact is somewhat greater, in relative and actual terms, than certain other basic industries in Sitka that may have a higher transient component or higher percentage of single men. APC's workforce has

*M.V. Aurora*





historically been a stable, year round, and well paid workforce, more so than any other Sitka private basic industry.

The overall forest products industry employment impact of the APC long-term sale includes pulp mill employment (373 jobs), direct logging employment (220 jobs), indirect logging employment (100 jobs), and indirect sawmill employment (150 jobs). This totaled 843 jobs in 1986, 35 percent of all forest products industry employment in Southeast Alaska. In terms of payroll, APC accounts for an estimated 35 percent, or \$30 million, of the total forest products industry payroll, estimated at \$84 million in 1986.

The sawmill employment occurs at the sawmill in Wrangell, which is owned by APC and operated as Alaska Wrangell Mill. An estimated 70 percent of Wrangell sawmill production is attributable to APC sawlog volume. APC is also a market for Wrangell chip production. This sawmill is the largest economic contributor to the Wrangell community, being directly or indirectly responsible for one-quarter of all employment in the Wrangell area. Several other communities, including Hoonah and Tenakee, experience employment and income benefits as a result of APC operations in the analysis area.

The harvest of APC Long-Term Sale volume in Analysis Area 12 averaged 35.5 million board feet (utility and sawlog volume) from 1986 to 1988. The harvest and road construction supported approximately 85 jobs. Processing of the pulp logs in Sitka and the sawlogs in Wrangell supported another 96 employees. The personal consumption expenditures of the 181 employees logging, hauling, and processing the timber and the purchases of the road building, logging, and milling businesses maintained another 120 jobs distributed across Southeast Alaska in the retail, service, transport, and government sectors.

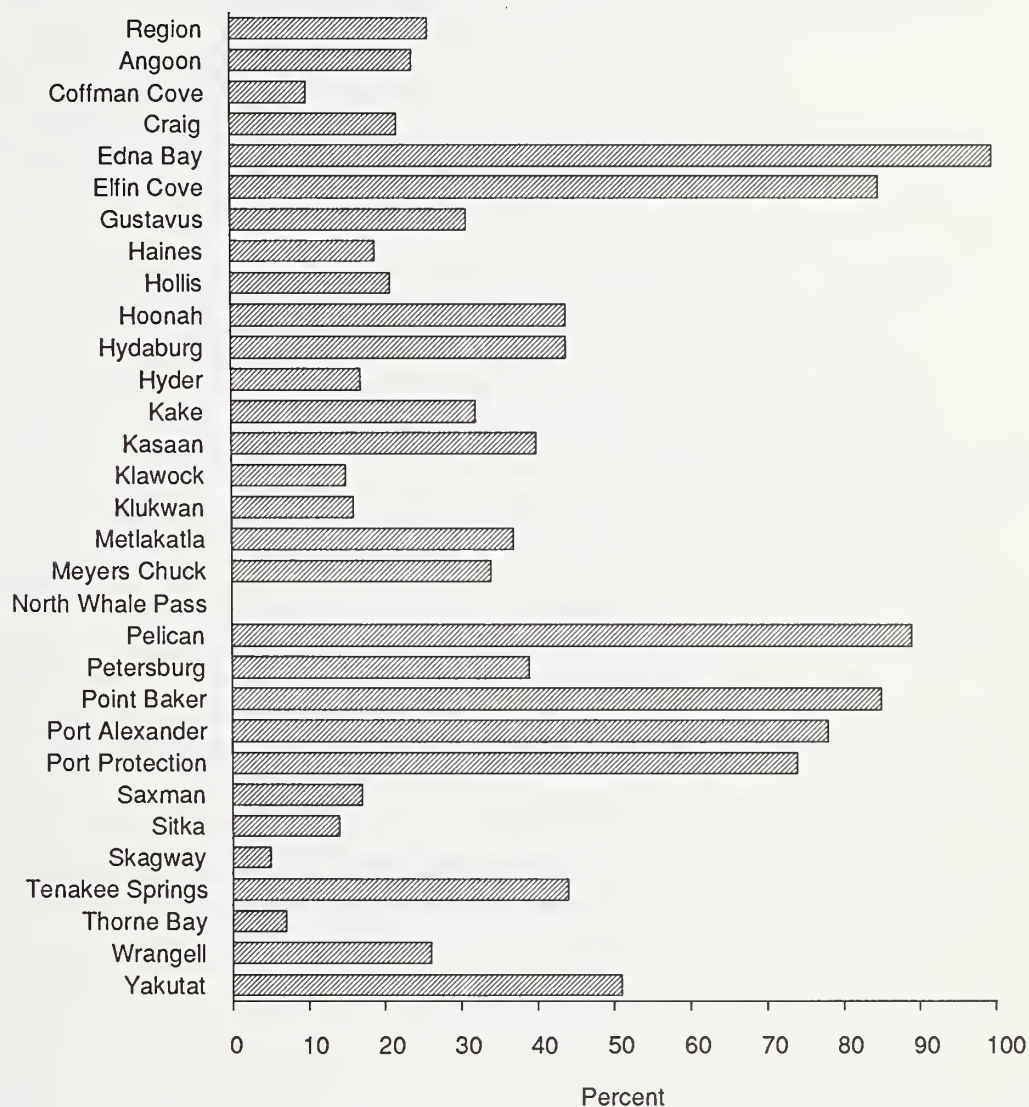
## Commercial Fishing

The comparative volumes and values reported in Figure 3-13 suggest that from one-half to two-thirds of the fish used by the fish processing industry is salmon. Assuming that employment in the industry is proportional to some combination of the values and volumes of fish processed, then from one-half to two-thirds of the industry's employment is dependent on salmon. National Forest habitats produce salmon harvested in Southeast Alaska's fisheries. If habitat is proportional to ownership of timberland in Southeast Alaska then the Tongass National Forest would contribute up to 80 percent of the salmon harvest. This result assumes that hatchery-reared stock in the harvest is minor and the combined catch of hatchery stocks, wild stocks originating outside Southeast Alaska, and wild stocks reared on private or State lands total approximately 20 percent of the total harvest.

Anadromous fish rearing habitat on the National Forest lands in Southeast Alaska likely supports just under 1,850 jobs (or 55 percent of employment) in the commercial fishing/fish processing sectors. About 700 more employees in the retail, service, supply, and construction sectors depend on the business purchases and personal consumption expenditures of these fishermen and fish processors. With total wage and salary employment in the region averaging about \$28,000 between 1980 and 1987, approximately 9 percent of the region's population depends on the harvest of salmon spawned on the National Forest in Southeast Alaska. Individual communities may have a higher degree of dependence. In addition, for some families, commercial fishing and processing work provide an income supplement rather than their principal source of earnings. For other families, income from fishing or cannery work is the only cash supplement to an otherwise subsistence lifestyle. The Tongass Resource Use Cooperative Survey (Kruse and Frazier 1988) reports the results of a survey in which sampled households were asked to indicate economic activity by type of industry. Communities that participate in the commercial fishery are shown in Figure 3-19.

Figure 3-19

# **Household Participation in Commercial Fishing and Fish Processing by Community<sup>1</sup>**



SOURCE: Kruse, J. and R. Frazier. 1988. Community Reports, Tongass Resource Use Cooperative Survey. Institute of Social and Economic Research, University of Alaska, Anchorage.

NOTE: While some families live exclusively on earnings from commercial fishing, participation in commercial fishery does not exclude other forms of employment or sources of income. This results from the fact that some families have several people in the labor force and some workers hold two or more jobs often in different sectors.

<sup>1</sup> The percent of sampled families indicating they were active in a commercial fishery in 1987.

## Tourism and Recreation

Visitor accommodation and recreational expenditures by tourists and recreationists of Southeast Alaska supported about 2,700 jobs during the 1980s. The purchases of Southeast Alaska businesses and the personal consumption of their employees supported another 1,160 employees. Together, tourism and recreational expenditures maintained approximately 14 percent of wage and salary employment in the region.

An estimated 285 jobs in Southeast Alaska depend on the expenditures made by hunters. About 820 jobs in the region result from the purchases of sport anglers. Another 475 jobs result from the purchases of businesses and their employees. In total, hunting and fishing related expenditures produce approximately 6 percent of the region's wage and salary employment.

Table 3-32

### Deer Hunting by Community in 1985

Community	Active Hunters (percent)	Hunter Days	Hunting Expenditures (dollars)
Angoon	21	521	44,991
Craig	28	1,504	172,340
Elfin Cove	90	194	22,847
Gustavus	6	128	1,624
Haines	6	1,963	39,821
Hoonah	33	1,229	114,925
Hydaburg	15	147	26,359
Juneau	11	13,906	1,634,555
Kake	22	407	40,293
Ketchikan	13	12,476	803,816
Klawock	33	1,443	57,091
Metlakatla	4	160	8,970
Meyers Chuck	23	100	3,781
Pelican	29	293	30,049
Petersburg	14	2,633	192,748
Point Baker	18	73	4,361
Port Alexander	12	64	2,290
Skagway	1	16	96
Sitka	22	8,834	945,915
Tenakee Springs	28	358	9,891
Wrangell	18	1,905	154,438
Yakutat	2	56	1,248
Other Prince of Wales	27	1,394	60,662
Other Alaska	— <sup>1</sup>	422	77,011
Outside Alaska	— <sup>1</sup>	352	98,886
Total for Southeast Region	14 <sup>2</sup>	50,578	4,549,008

SOURCE: Fay, G. and M. Thomas. 1986. Deer Hunter Economic Expenditures and Use Survey, Southeast Alaska. ADF&G Habitat Technical Report 86-10.

<sup>1</sup> Information not available.

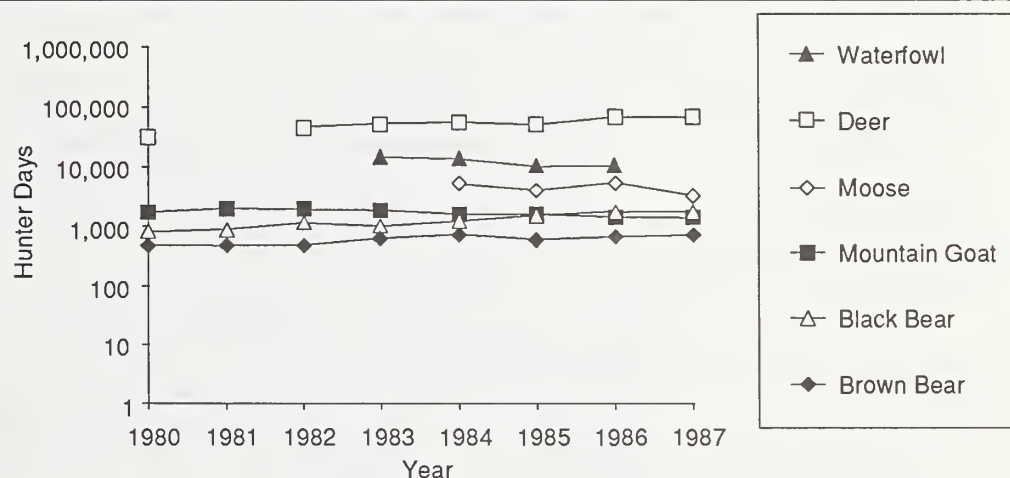
<sup>2</sup> Percentage value is the average for the communities.



Hunter effort in Analysis Area 12 forms the basis for some of the expenditures that support jobs and personal earnings in Southeast Alaska. Figure 3-20 presents hunter-days for the Southeast Region, Table 3-32 summarizes information on deer hunting, and Figure 3-21 on fishing. Deer hunting has been closed on Kuiu Island since 1976. Since access is limited to Analysis Area 12, commercial tourism and recreation opportunities are also limited. There is one black bear hunter guide service that operates in Analysis Area 12.

Figure 3-20

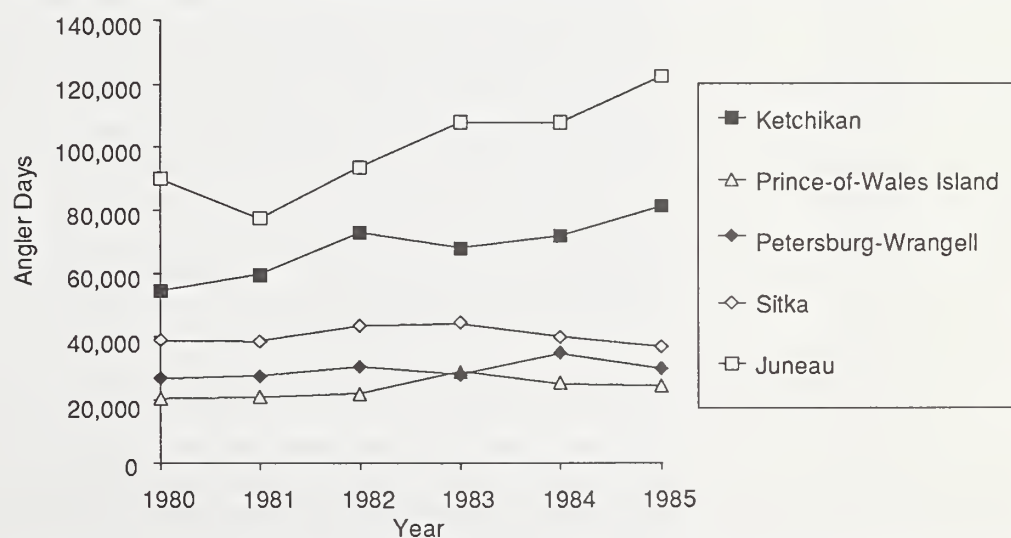
### Number of Hunter Days in Southeast Region



SOURCE: Fay, G. and M. Thomas. 1986. Deer Hunter Economic Expenditures and Use Survey, Southeast Alaska. ADF&G Habitat Technical Report 86-10. 1987 data from personal communication with ADF&G.

Figure 3-21

### Angler Days in Southeast Alaska, 1980 — 1985



SOURCE: Mills, M. J., Statewide Harvest Study, Vol. 27, Federal Aid in Fish Restoration and Anadromous Fish Studies, Alaska Department of Fish & Game, Table 7, page 15.

## Subsistence

The Forest Service's 1981-86 Record of Decision preceded the passage of the Alaska National Interest Lands Conservation Act (ANILCA). The Federal District Court, in *Tenakee Springs v. Courtright*, did not decide if the Forest Service complied with Section 810 of ANILCA. To ensure that the 1981-86 and 1986-90 Records of Decision comply with ANILCA, the Forest Service has provided discussions of subsistence in Phases I and II of the EIS Supplement.

Many Southeast Alaska communities depend on natural resources found in the APC Contract area for their livelihood. Activities such as fishing, hunting, tourism, timber harvest, and mining all depend on natural resources. With the passage of the Alaska National Interest Lands Conservation Act, Congress also recognized the importance of subsistence resources to the rural communities of Alaska. ANILCA defines subsistence as:

The customary and traditional uses by rural Alaska residents of wild, renewable resources for direct personal or family consumption as food, shelter, fuel, clothing, tools, or transportation; for the making and selling of handicraft articles out of nonedible byproducts of fish and wildlife resources taken for personal or family consumption; for barter, or sharing for personal and family consumption; and for customary trade (ANILCA, 16 USC 3113).

Since the passage of ANILCA, two Section 810 evaluations have been made for most of Analysis Area 12. The first evaluation was associated with the 1986-90 Operating Period FEIS for the Alaska Pulp Corporation Long Term Sale. The second evaluation was associated with the "TTF and Camp Location for Timber Harvest Scheduled from East Kuiu Island" environmental assessment (Forest Service 1987). Both ANILCA Section 810 evaluations concluded that the proposed actions would have no or only minor potential impact on the subsistence use of Kuiu Island. In *Hanlon v. Barton*, however, the Court concluded that the Forest Service must consider the cumulative impacts on subsistence of past, proposed, and reasonably foreseeable future activities in conducting its subsistence analysis under ANILCA 810. These impacts will be discussed in Chapter 4.

The sharing of subsistence products among community members is an important aspect of traditional subsistence use. Table 3-33 shows the pounds of subsistence resources harvested per capita as well as the number of different types of resources harvested. It also shows the number of different types of resources that are shared (received by a household). Low income households or households whose members are unable to participate in the harvest of subsistence resources may depend on receiving products from other members of the community. Therefore, the importance of subsistence to a community can be shown, not only in the amount harvested, but also in the amount of sharing that occurs among community members.

Mean income is another indicator of the importance of subsistence to a community. A household with a higher income would be able to supply more of its needs through the cash economy. However, it should be noted that a higher income does not always indicate a lesser dependence on subsistence resources. For example, people who earn high incomes may give the resources they harvest to others who are unable to harvest their own.

Even if a household can purchase all of its food needs through the cash economy, the act of gathering subsistence resources is an important cultural aspect in Southeast Alaska communities. For example, traditional foods may not be available through any means other than subsistence gathering. The occasions for gathering wild foods are often also social events. Historical patterns of movement, such as the annual cycle of dispersal into small family groups at summer fishing camps to larger gatherings at potential winter villages are also linked to the tradition of subsistence harvest.

Communities that use Analysis Area 12 for subsistence are Kake, Point Baker, Port Protection, Petersburg, Wrangell, and Port Alexander. Information on the history, population, economy, and subsistence uses for these communities follows.

## Kake

Kake is located on northwestern Kupreanof Island. Kake was one of many villages occupied by the Kake Tlingits in the 18th and 19th centuries. In the mid-1800s, the Kake Tlingits inherited traditional and customary aboriginal rights to portions of Kuiu Island. These additional land rights are believed to have included the northern one-third of Kuiu and joint rights with the Klawock Tlingits to the central portion of the island.

With a major camp on Security Bay (VCU 400), the Kake people used Analysis Area 12 extensively for gathering, fishing, and hunting. Resources utilized included chum salmon, Sitka black-tailed deer, wild and cultivated plants, and a full range of invertebrates. Permanent and seasonal settlements were also located in Saginaw Bay (VCU 399), Port Camden (VCU 420) and in Rocky Pass (VCU 428). In the areas of Three-Mile Arm and Conclusion Island (VCUs 417, 418 and 419) they built cabins and smokehouses and practiced gathering, fishing, trapping, and hunting. The Kake Tlingits used the Washington Bay area (VCU 401) for harvesting herring. Rowan and Pillar Bays (VCUs 402 and 403) were additional gathering, fishing, hunting, and trapping areas.

Several historic Tlingit villages and fishing camps were consolidated during the late 1800s and early 1900s at the village of Kake, primarily in response to compulsory schooling laws. A school and store were built in 1891, and a cannery built in the area in 1912 still operates. A cold storage was built in 1980.

Table 3-33

### Role of Subsistence in Community Lifestyles

	Pounds Harvested Per Capita <sup>1</sup>	Resource Types Harvested	Resource Types Received	1987 Per Capita Income
Angoon	242	7.9	6.4	\$5,364
Elfin Cove	264	10.0	6.8	\$8,195
Gustavus	256	8.5	4.2	\$12,781
Haines	105	4.3	4.1	\$12,467
Hoonah	404	9.1	7.7	\$9,353
Kake	160	6.5	7.0	\$9,057
Klukwan	239	5.9	6.1	\$5,853
Pelican	355	10.0	9.0	\$11,317
Petersburg	203	7.4	5.1	\$12,602
Point Baker	345	9.4	5.3	\$6,212
Port Alexander	306	9.7	5.4	\$6,343
Port Protection	311	10.2	7.7	\$5,912
Sitka	139	5.7	0	\$14,572
Tenakee Springs	343	7.5	5.5	\$9,080
Wrangell	164	5.6	6.3	\$11,989
Southeast Alaska	176	6.2	3.7	\$11,921

SOURCE: Kruse, J. and R. Frazier, 1988. Community Reports, Tongass Resource Use Cooperative Study. Institute of Social and Economic Research, University of Alaska, Anchorage, in cooperation with ADF&G Division of Subsistence.

<sup>1</sup> Mean value is estimated from a sample of households in each community. Actual amounts harvested may be somewhat higher or lower.



Figure 3-22  
1987 Harvest of Principal Subsistence Resources - Kake



SOURCE: Kruse, J. and R. Frazier. 1988. Community Reports, Tongass Resource Use Cooperative Survey. Institute of Social and Economic Research, University of Alaska, Anchorage, in cooperation with ADF&G Division of Subsistence.

Historically, Kake's economy was based largely on commercial fishing of salmon, halibut, and trout from nearby waters. Logging has taken place in the area since the 1940s. In recent years, logging on land owned by the village corporation has provided some employment opportunities for Kake residents. Logging activities on both private and public lands have resulted in a local road system that residents use to access fishing, berrying, and grouse hunting areas.

The 1985 population of 634 was almost 70 percent Alaska Native. The major sources of employment include: fishing and fish processing, 28 percent; logging, 18 percent; longshoring, 13 percent; school, 8 percent; and government, 1 percent. Employment is highly seasonal with more than 50 percent unemployed during a 1985 survey. Although the average income was about \$16,000, almost 40 percent reported no income (ADF&G 1989). The Tongass Resource Use Cooperative Study (TRUCS) reported a mean per capita income of about \$9,000 in 1987 (Kruse and Frazier 1988).

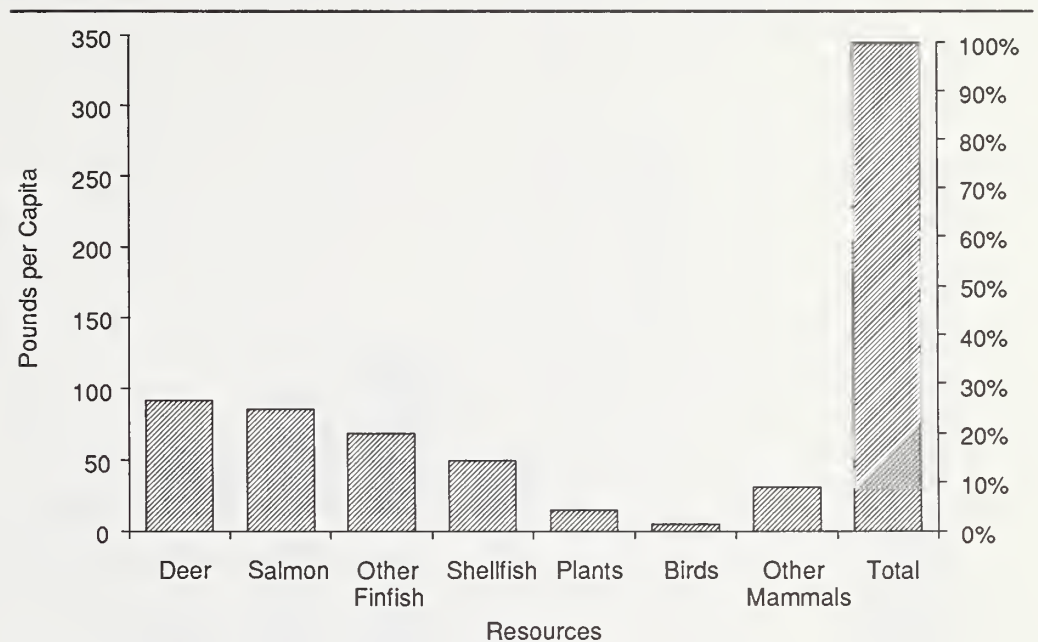
In pursuing traditional subsistence, Kake residents hunt deer, bear, seals, grouse, and waterfowl, fish, trap furbearers, and gather shellfish, seaweed, and berries. The annual harvest of subsistence resources was about 160 pounds per capita in 1987, dominated by deer (24 percent), salmon (22 percent), and other finfish (21 percent) (Figure 3-22). Subsistence provides just over 20 percent of the household food supply.

## Point Baker and Port Protection

Point Baker and Port Protection are located at the northwestern tip of Prince of Wales Island. While these two communities are separate, they are located in close proximity and share a similar history, economy, and resource use. The first floating fish packer came to Point Baker to buy fish in 1919 but the area was not settled until the 1930s when the Forest Service opened it for home sites. Stores and a post office were opened in the 1930s and 1940s.

Figure 3-23

### 1987 Harvest of Principal Subsistence Resources - Point Baker



SOURCE: Kruse, J. and R. Frazier. 1988. Community Reports, Tongass Resource Use Cooperative Survey. Institute of Social and Economic Research, University of Alaska, Anchorage, in cooperation with ADF&G Division of Subsistence.

Point Baker and Port Protection grew as increasing numbers of hand trollers used the area for a home base, and some built homes there. The State built a floating dock at Point Baker. The local economy is based on fishing, primarily by hand-trollers with some gill-netters and power-trollers. Logging activities, including the development of a logging camp in nearby Labouchere Bay, have affected both communities in recent years.

More than 90 percent of the combined population of about 100 residents (1985 estimate) is non-Native. The major sources of employment include: fishing, 61 percent; retail, 25 percent, and school, 13 percent. Employment is highly seasonal. The average income was reported to be about \$7,500 in 1985. The TRUCS study reported a mean per capita income of about \$6,000 for each community in 1987 (Kruse and Frazier 1988).

In Point Baker, subsistence provides over 50 percent of the household food supply, placing the community among the Southeast Alaska communities that most rely on natural resources. Residents harvest annually about 350 pounds per capita of subsistence resources, dominated by deer (27 percent), salmon (26 percent), and other finfish (19 percent) (Figure 3-23).

In Port Protection, subsistence provides more than 40 percent of the household food supply for Port Protection residents, also placing the community among those that most rely on natural resources. Residents harvest annually about 300 pounds per capita of subsistence resources, dominated by salmon (36 percent) and other finfish (29 percent) and supplemented by shellfish (15 percent) and deer (13 percent) (Figure 3-24).

Figure 3-24

## 1987 Harvest of Principal Subsistence Resources - Port Protection



SOURCE: Kruse, J. and R. Frazier. 1988. Community Reports, Tongass Resource Use Cooperative Survey. Institute of Social and Economic Research, University of Alaska, Anchorage, in cooperation with ADF&G Division of Subsistence.

## Petersburg

Located in the east-central portion of Southeast Alaska, Petersburg is situated on the north-west shore of Mitkof Island, at the north end of Wrangell Narrows. Historic use of the Petersburg area was made by the Tlingit people from nearby Kake. They had established a summer fishing camp on north Mitkof Island that was still active when white settlers began to move into the area. The area around present-day Petersburg has been in continuous use by Tlingits since prehistoric times.

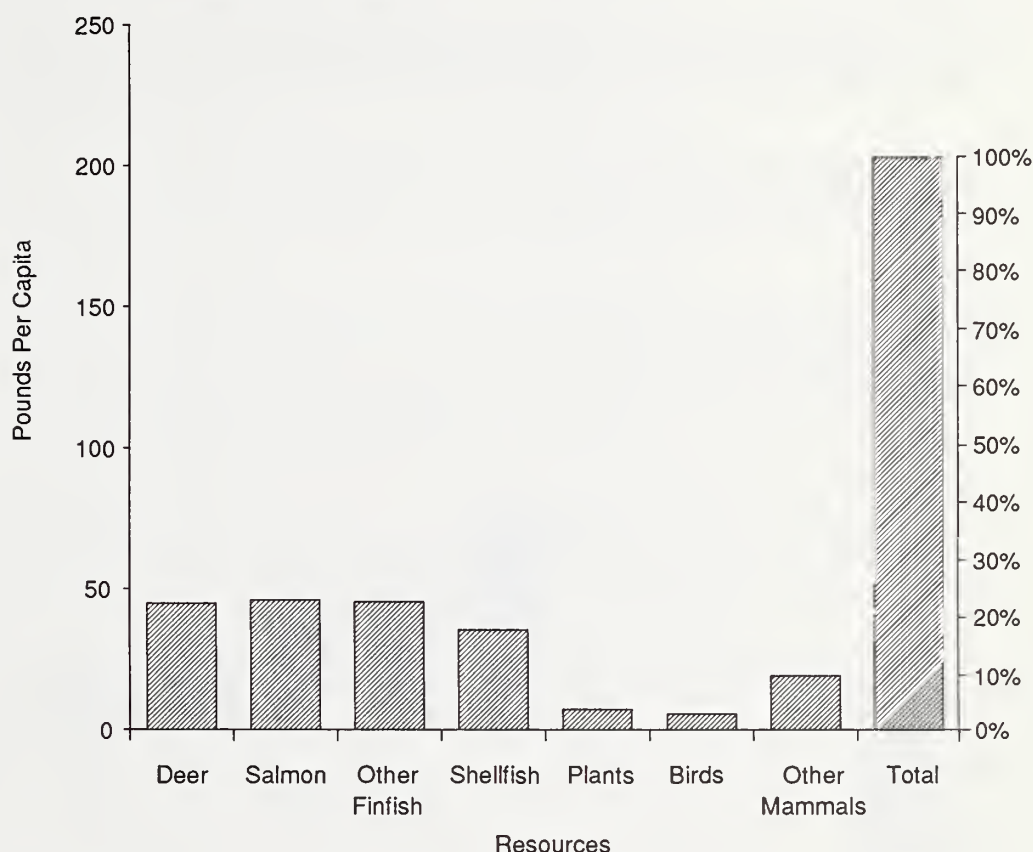
In the late 1890s, Peter Buschmann, a Norwegian fisherman from Tacoma, homesteaded a site with good potential for a year-round fish-processing industry. He liked the well-protected harbor, available timber, and a ready supply of ice from the Le Conte Glacier, only 25 miles away. Buschmann started the Icy Strait Packing Company cannery and by 1900 a community had grown. In its first season of operation, the cannery packed 32,750 cases of salmon. Buschmann's community, named Petersburg, grew rapidly. A sawmill, packing house, and docks were added and it soon became a center for fishing and fish processing. In contrast to the boom and bust mining towns, Petersburg became a stable year-round community. Except for a slight decline in the 1950s, the community grew steadily. Today, Petersburg is an active fishing community with fishing, fish processing, and timber being the predominant industries.

The 1987 estimated population of 3,282 residents (Smythe 1988) was about 13 percent Alaska Native (ADF&G 1989). The major sources of employment include seafood processing/manufacturing, 36 percent; government, 28 percent; retail trade, 13 percent; and construction, 9 percent. Employment in the manufacturing, retail, and construction sectors is seasonal. The average income is over \$19,000 and unemployment was about 16 percent of the total population. (ADF&G 1989).



Figure 3-25

### 1987 Harvest of Principal Subsistence Resources - Petersburg



SOURCE: Kruse, J. and R. Frazier. 1988. Community Reports, Tongass Resource Use Cooperative Survey. Institute of Social and Economic Research, University of Alaska, Anchorage, in cooperation with ADF&G Division of Subsistence.

Local subsistence resource use includes deer, bear, moose, salmon, other fish, waterfowl, clams, crabs, and berries. The annual harvest of subsistence resources was about 203 pounds per capita in 1987, primarily for salmon (23 percent), other finfish (22 percent), and deer (22 percent). (Figure 3-25). In Petersburg, subsistence provides just over 30 percent of the household food supply.

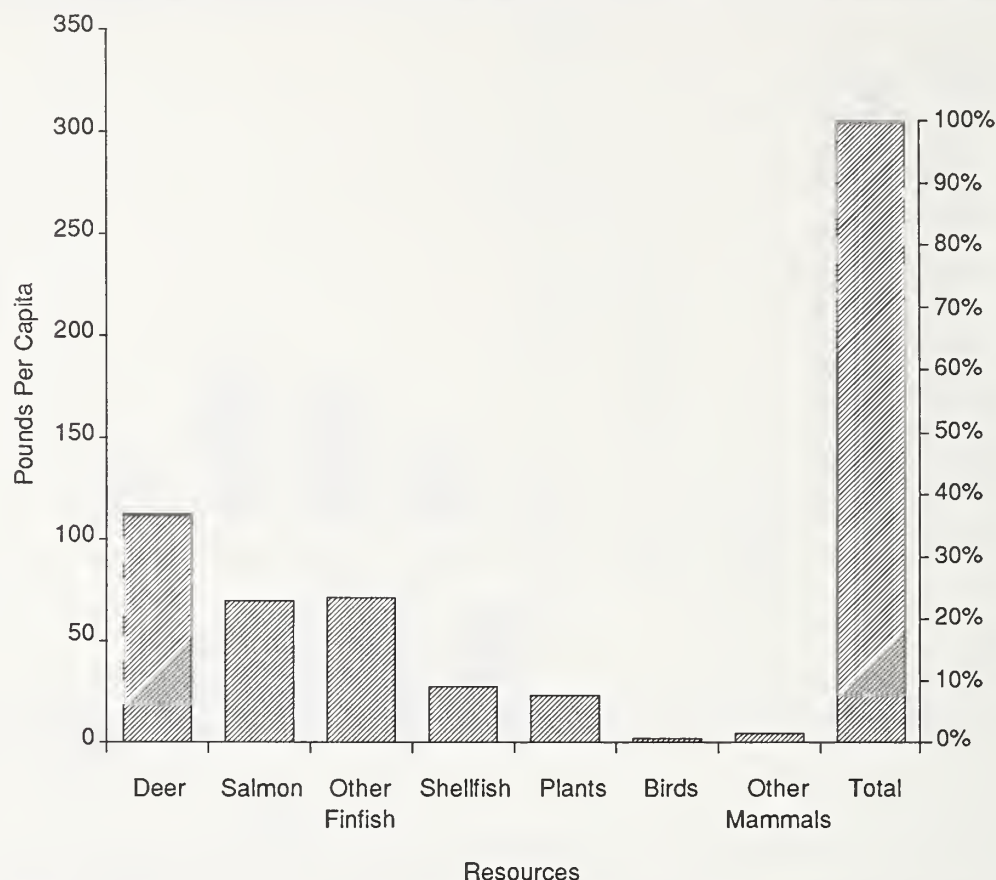
## Port Alexander

Port Alexander is located on the eastside of Baranof Island, about 65 miles south of Sitka, and 90 miles west of Wrangell. In 1795, Captain George Vancouver recorded his entry into the cove now called Port Alexander. Vancouver found a deserted village, probably of Kake Tlingit origin. Fifty-five years later, the site was named by a Russian explorer.

Safe anchorage during rough weather in Chatham Strait and rich fishing grounds nearby led to fishermen using Port Alexander as a seasonal base. Along with the growth of the fishing industry, land-based businesses developed. In 1916, the community included a store, bakery, and salmon saltery. Then a fuel dock, fish buyer, wireless station, restaurant, warehouse, butcher shop, and general store were added. By 1930, Port Alexander had become the center of the state's trolling fleet with over 100 people residing there. With a decline in the salmon industry and the onset of World War II, Port Alexander's population decreased. In 1950, only 22 residents remained.

Figure 3-26

## 1987 Harvest of Principal Subsistence Resources - Port Alexander



SOURCE: Kruse, J. and R. Frazier. 1988. Community Reports, Tongass Resource Use Cooperative Survey. Institute of Social and Economic Research, University of Alaska, Anchorage, in cooperation with ADF&G Division of Subsistence.

Port Alexander is still a commercial fishing center, with a 1985 population over 100. Only about 5 percent of the Port Alexander residents are Alaska Natives. The major sources of employment include: fishing, 75 percent; government, 15 percent; and school, 10 percent. Employment tends to be highly seasonal in all sectors except government.

Port Alexander residents use a variety of subsistence resources including deer, mountain goats, bear, water fowl, grouse, furbearers, trout, salmon, other marine fish, clams, crabs, and berries. The annual harvest of subsistence resources was about 306 pounds per capita in 1987, dominated by deer (37 percent), salmon (23 percent), and other finfish (23 percent) (Figure 3-26). In Port Alexander, subsistence provides almost 65 percent of the household food supply.

## Wrangell

Wrangell, located in the east-central portion of southeast Alaska, is on the northern tip of Wrangell Island, about seven miles from the mouth of the Stikine River. The Stikine is one of only a few major rivers that cut through the massive coastal mountains providing access into Canada. Historically, it has been an important trade route. Tlingit people from a major village 13 miles from the present site of Wrangell used the Stikine to trade with the Athapaskans in the Interior.

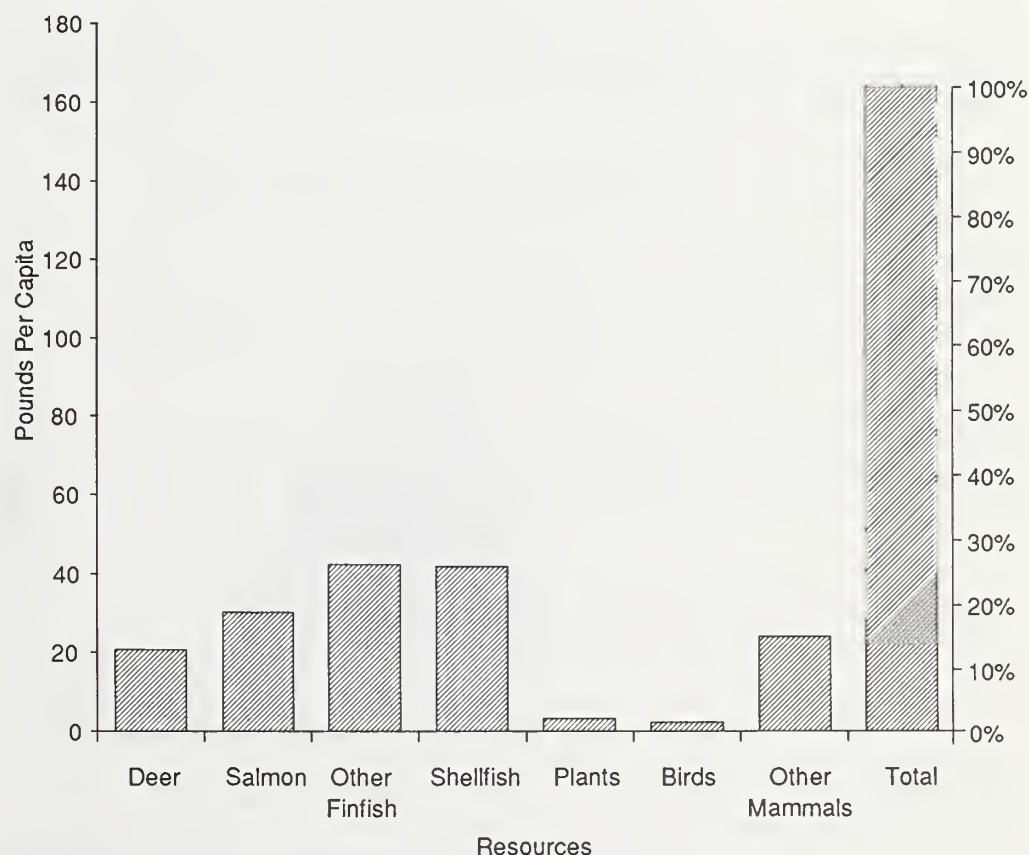
Russian traders and Canadians were also interested in the Wrangell area. The Russians were first to build a fort, but then leased the land to the Hudson Bay Company. Under a British flag, Wrangell became a major trading center in the area.

Wrangell was a jumping-off point for three successive gold rushes. The boom and bust cycles of the mining affected its growth and economy. By the time the third strike had run its course, though, two canneries and a sawmill were established. Today it is an active fishing and timber-processing town.

The 1985 population of 2,836 was almost 40 percent Alaska Native. The major sources of employment include: government, 25 percent; retail trade, 19 percent; manufacturing, 16 percent; fishing and fish processing, 13 percent. Employment in the tourism, retail, and fishing sectors is seasonal.

Wrangell residents hunt deer, moose, bear and waterfowl, fish for salmon, halibut, and other marine fish, and gather shellfish and berries. The annual harvest of subsistence resources was about 165 pounds per capita in 1987, dominated by shellfish (25 percent), salmon (18 percent), and other finfish (26 percent) (Figure 3-27). Subsistence provides 23 percent of the household food supply for Wrangell residents.

Figure 3-27  
**1987 Harvest of Principal Subsistence Resources - Wrangell**



SOURCE: Kruse, J. and R. Frazier. 1988. Community Reports, Tongass Resource Use Cooperative Survey. Institute of Social and Economic Research, University of Alaska, Anchorage, in cooperation with ADF&G Division of Subsistence.



## Use of Analysis Area VCUs

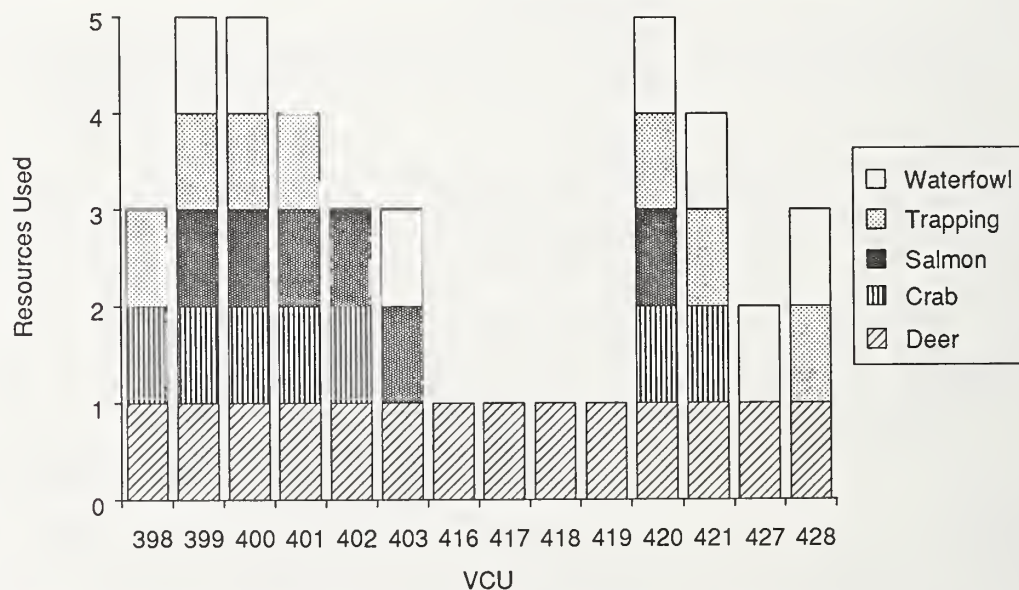
All of the VCUs in analysis Area 12 are used by more than one user community. Subsistence use areas in Analysis Area 12 are shown on the Important Subsistence Use Map folded at the back. This map only shows use of the Analysis Area for subsistence harvest of deer, salmon, and furbearers. The map information is based on University of Alaska, Forest Service, and ADF&G subsistence survey data. Data sources include the TRUCS survey and ADF&G Technical reports (complete citations are found in Chapter 7, Literature Cited). All the communities and households that use an area have been given equal weight in the mapping process. Therefore, the map shows areas of subsistence use without reference to which communities may be using a particular location and without indications of the intensity or frequency of that use. All inventory data, including intensive and extensive use areas, were considered in developing the subsistence use map. These data are available for review in the Planning Record.

Kake residents historically hunted deer in all of the Analysis Area 12 VCUs (Figure 3-28), although the harvests of crab, salmon, furbearers, and waterfowl are each limited to about half the VCUs.

As shown in Figure 3-29, subsistence users from Point Baker and Port Protection have historically hunted deer and presently hunt waterfowl in VCUs 416 through 419 and 428, and furbearers in VCUs 416 through 418. While residents of Point Baker and Port Protection report having harvested crab in VCUs 416 through 419, recent research by the Forest Service and the Alaska Department of Fish and Game (Appendix B-1, Phase II Draft SEIS for Analysis Area 12), suggests that crab populations are low in these areas. Work performed for an environmental assessment on the proposed No Name Bay LTF indicated that residents of Point Baker and Port Protection use the entire shoreline of No Name Bay for deer and waterfowl hunting (Forest Service 1987). The anchorage inside the bay is used by hunters and fishermen.

Figure 3-28

### Kake Use of Analysis Area VCUs

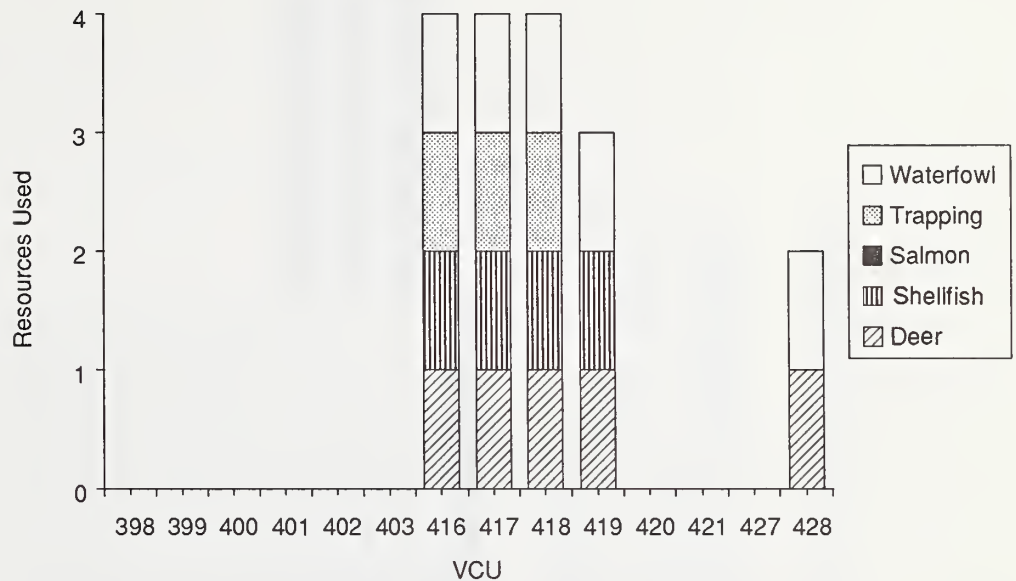


SOURCE: Kruse, J. and R. Frazier. 1988. Community Reports, Tongass Resource Use Cooperative Survey. Institute of Social and Economic Research, University of Alaska, Anchorage, in cooperation with ADF&G Division of Subsistence.

NOTE: Resources used include both historic and current use of analysis area VCUs. Deer hunting has not been allowed in Analysis Area 12 since 1976.

Figure 3-29

**Point Baker and Port Protection Use of Analysis Area VCUs**



SOURCE: Kruse, J. and R. Frazier. 1988. Community Reports, Tongass Resource Use Cooperative Survey. Institute of Social and Economic Research, University of Alaska, Anchorage, in cooperation with ADF&G Division of Subsistence.

NOTE: Resources used include both historic and current use of analysis area VCUs. Deer hunting has not been allowed in Analysis Area 12 since 1976.

Residents of Port Alexander have historically used most of Analysis Area 12 for subsistence deer hunting (Figure 3-30). Salmon are harvested along the western edge of Analysis Area 12, including Security Bay, Rowan Bay, and Bay of Pillars. Waterfowl hunting is limited to two VCUs, 400 and 421, the Security Bay and Kadake Creek areas.

Subsistence users from Petersburg historically used the central portions of Analysis Area 12 for deer harvests. Currently they use this area for waterfowl hunting, trapping, salmon fishing, and gathering shellfish. Rowan Bay, Bay of Pillars, Port Camden, Rocky Pass, Threemile Arm, and Kadake Creek areas are the principal locations of Petersburg residents' subsistence activities in Analysis Area 12 (Figure 3-31).

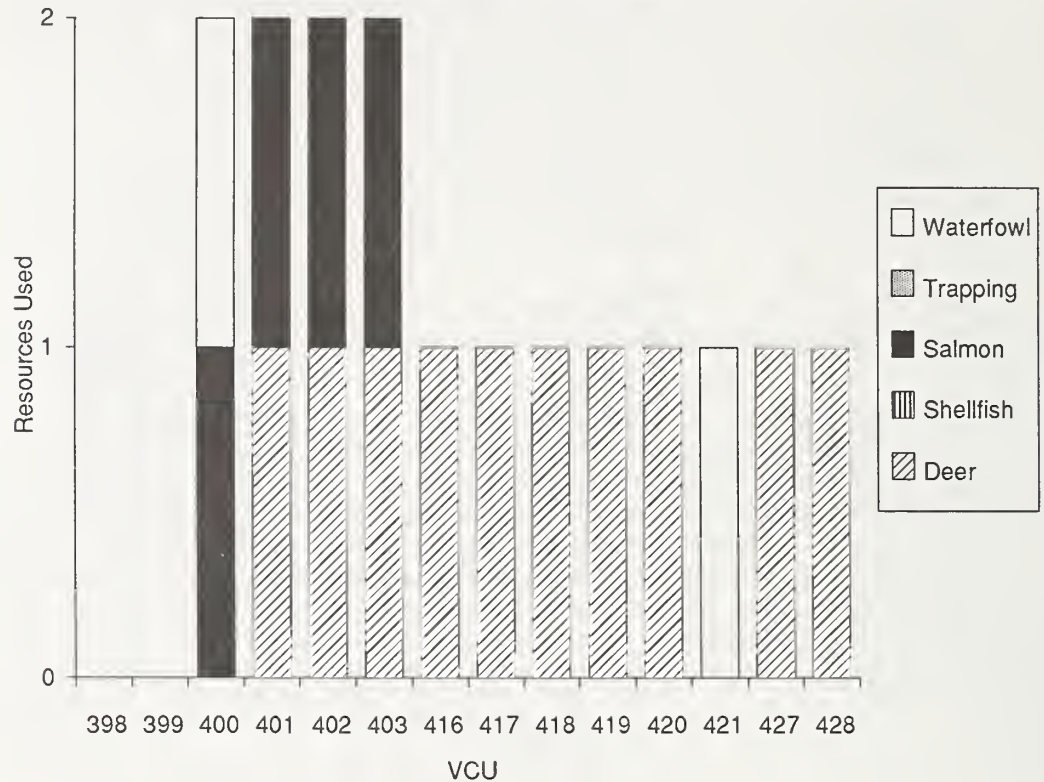
Wrangell residents use most of the VCUs in Analysis Area 12 for subsistence hunting of waterfowl, salmon fishing, and gathering of shellfish. Historically, they also hunted deer in the area. Subsistence activities are conducted in all VCUs in the Analysis Area (Figure 3-32).

Kake residents have expressed concerns about the effects of logging activities on coho runs in the Security and Saginaw Bay areas as well as the effects on various fish species in the Kadake Creek area. Residents of both Point Baker and Port Protection view the eastern Kuiu Island VCUs 416 through 418 as important to their subsistence activities. Residents of all six subsistence communities have expressed concerns about the management of fish and game as well as forestry.

The traditional means of access for subsistence use on Kuiu Island is by boat. Although portions of Kuiu Island are extensively roaded, the only vehicles using the roads are those used by the Forest Service, APC, and contractors engaged in logging, support activities, or

Figure 3-30

## Port Alexander Use of Analysis Area VCUs



SOURCE: Kruse, J. and R. Frazier. 1988. Community Reports, Tongass Resource Use Cooperative Survey. Institute of Social and Economic Research, University of Alaska, Anchorage, in cooperation with ADF&G Division of Subsistence.

USFS. 1987. TTF and camp location for timber harvest scheduled from East Kuiu Island; No Name Bay Environmental Assessment. USDA Forest Service, Alaska Region, Juneau, Alaska.

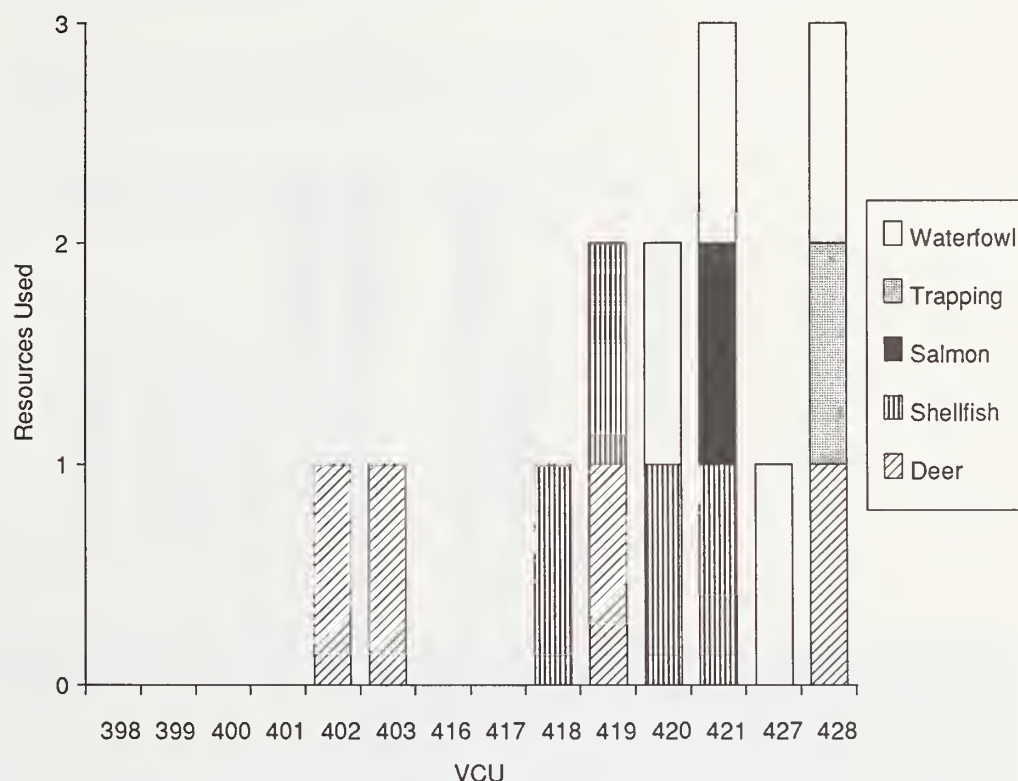
NOTE: Resources used include both historic and current use of analysis area VCUs. Deer hunting has not been allowed in Analysis Area 12 since 1976.

administration. While APC's policy of limiting privately owned vehicles at Rowan Bay is not strictly enforced, the only means of transporting vehicles to Kuiu Island is by barge. The Alaska Marine Highway System does not serve Kuiu Island and will not do so in the foreseeable future.

All of the VCUs in Analysis Area 12 are used for the harvest of subsistence resources. Locations used for harvesting subsistence resources on east Kuiu Island include Security Bay, Kadake Bay, Threemile Arm, Port Camden, Rowan Bay, Saginaw Bay, and the Bay of Pillars. Subsistence users are from Kake, Point Baker, Port Protection, Port Alexander, Petersburg, and Wrangell. Subsistence users from these communities and Sitka harvest sockeye salmon in VCU 403, the Bay of Pillars.



Figure 3-31  
**Petersburg Use of Analysis Area VCUs**

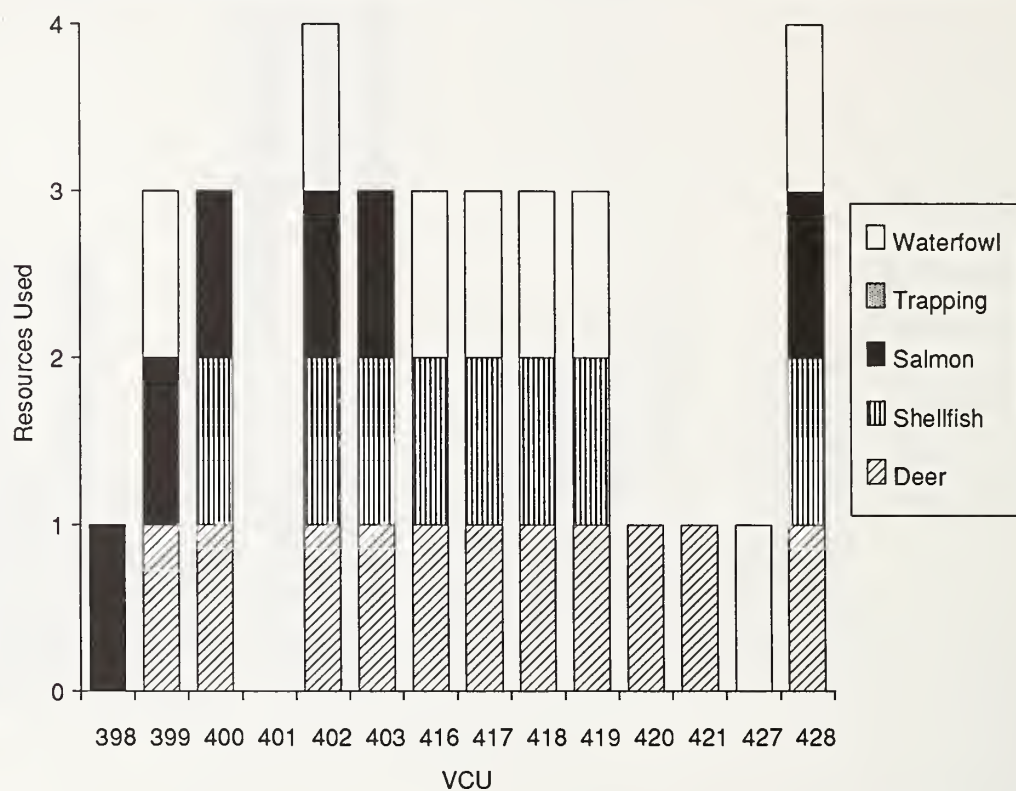


SOURCE: Kruse, J. and R. Frazier. 1988. Community Reports, Tongass Resource Use Cooperative Survey. Institute of Social and Economic Research, University of Alaska, Anchorage, in cooperation with ADF&G Division of Subsistence.

Smythe, C. W. 1988. Harvest and use of fish and wildlife resources by residents of Petersburg, Alaska. ADF&G, Division of Subsistence, Juneau, Alaska. Technical Paper No. 164.

NOTE: Resources used include both historic and current use of analysis area VCUs. Deer hunting has not been allowed in Analysis Area 12 since 1976.

Figure 3-32  
Wrangell Use of Analysis Area VCUs



SOURCE: Kruse, J. and R. Frazier. 1988. Community Reports, Tongass Resource Use Cooperative Survey. Institute of Social and Economic Research, University of Alaska, Anchorage, in cooperation with ADF&G Division of Subsistence.

Cohen, K. A. 1989. Wrangell harvest study. ADF&G, Division of Subsistence, Juneau, Alaska. Technical Paper No. 165.

NOTE: Resources used include both historic and current use of analysis area VCUs. Deer hunting has not been allowed in Analysis Area 12 since 1976.

# Chapter 4

## Environmental Consequences







# Chapter 4

## Environmental Consequences

Chapter 4 provides the scientific and analytic basis for comparing the environmental effects of the alternatives described in Chapter 2, Alternatives Including the Proposed Action. The evaluation of the alternatives and their relationship to the issues introduced in Chapter 1 is the focus of Chapter 4.

Chapter 4 is presented in four sections. The first is an evaluation of the resource categories described in Chapter 3, (i.e., soils, vegetation, wildlife, etc.). Within each resource category certain impacts are common to all alternatives. These impacts are evaluated together. Then the effects of each alternative on that resource category are evaluated. These site-specific consequences are discussed in terms of short-term effects.

The second part of Chapter 4 is titled Reasonably Foreseeable, Long-Term, and Cumulative Effects. The reasonably foreseeable, long-term impacts for the SEIS alternatives are presented as well as the effects of adjacent harvest, past harvest, and harvest anticipated through the life of the APC Contract (year 2011). The assumptions used in these long-term projections are displayed at the beginning of this second part of Chapter 4.

*Second Growth on Kuiu Island*



The third section of Chapter 4 includes Other Environmental Considerations that must be addressed under NEPA but do not readily fall under the resource categories discussed in Chapter 3. These topics include unavoidable adverse environmental effects, the relationship between short-term use and the maintenance and enhancement of long-term productivity; the irreversible and irretrievable commitment of resources; possible conflicts between alternatives and other land uses; energy requirements; and natural, depletable resource requirements.

The fourth part of Chapter 4 discusses mitigation measures. It reviews those measures already adopted to avoid or reduce impacts, including the standards and guidelines in use by policy. It then summarizes the site-specific and impact-specific mitigation measures that will be applied.

## Resource Categories

### Soils

Certain management activities can increase the frequency and magnitude of soil erosion. Logging and road construction pose the greatest threats. Road construction produces the greatest opportunity for chronic soil loss and sedimentation. About 90 percent of this soil loss occurs during the first three years after construction. The rate of soil loss then decreases as vegetative cover is reestablished on slopes and as less soil is available to erode.

Landslides can be triggered by removing vegetation or by altering mechanical support (e.g., making cutbanks along road alignments). The chance of stream-caused erosion increases when braided stream channels are logged or crossed with roads.

In Analysis area 12, all mapped soil areas classified as having a high hazard of mass wasting that were considered for harvest or road building were verified in the field. Road locations and harvest unit boundaries were modified to avoid the most slide-prone areas. Therefore, there are no roads or harvest units proposed on areas of high hazard soils in any of the alternatives. This greatly reduces the potential to negatively impact long-term soil productivity. As shown in Tables 4-1 and 4-2, all the proposed action alternatives will have a similar short-term effects on soils.

Table 4-1

### Acres of Harvest by Soil Hazard Class

Soil Hazard	Alternative			
	2	3	4	5
High	0	0	0	0
Moderate	1,378	1,726	1,424	1,682
Low	1,224	1,418	1,206	1,405

SOURCE: SEIS Planning Record.

Table 4-2

### Miles of Proposed Road by Soil Hazard Class

Soil Hazard	Alternative			
	2	3	4	5
High	0	0	0	0
Moderate	21.20	24.02	19.02	24.59
Low	34.81	40.11	26.76	34.03

SOURCE: SEIS Planning Record.



There remains a potential for landslides and surface erosion on areas classified as having a moderate or moderately high soil hazard. These areas, however, can be managed without measurable increases in chronic soil erosion by careful application of project standards and guidelines and timely application of the erosion control provisions of the Timber Sale Contract.

Standards and guidelines frequently include modifications to the harvest system such as split line or full suspension yarding. These measures are identified on the unit cards which are displayed in Appendix A-1. Contractual provisions that are employed to protect the soil resource include revegetation (grass seeding and fertilizing) of all cut and fill slopes, landings, and other yarding disturbances, as well as installing water bars on all temporary roads.

Although the above measures are expected to effectively protect against any significant effects on soils, there is a possibility that management activities may contribute to the risk of soil movement. Because of this it is useful to look at the acres of soil disturbance within various soil hazard rating areas as a means of comparing alternatives. The Stikine Area GIS database, which is part of the Planning Record, contains a digital map of soil hazard ratings which can be overlaid with proposed harvest units and roads, making it possible to compare the relative risk of soil movement for each of the alternatives. Tables 4-1 and 4-2 summarize this information. Although the risk to soils are similar among the alternatives, the risk under Alternative 3 is slightly higher, and under Alternative 2 slightly lower, than the other alternatives.

The potential impact each alternative has on soil productivity is related to the total acres harvested and miles of road built. However, the effects will vary widely from location to location, depending on such factors as the kind of yarding system employed (which bears directly on the amount of soil disturbance) and soil type. Logging reduces soil productivity in areas used for roads, landings, and borrow sites. Those areas generally amount to between 5 to 10 percent of most harvest units.

## Vegetation

Each of the action alternatives distributes the locations of timber harvest activities differently within Analysis Area 12. However, the vegetation types affected are the same. The short-term effect on vegetation for all the action alternatives would be the conversion of climax forest stands into young, successional stands. The removal of the forest overstory would change the microsite conditions that had influenced the species composition and density of the understorey vegetation. Species that thrive best in the shaded and protected environment under the mature forest, such as some mosses, liverworts, lichens, herbs, and shrubs, would find themselves without the beneficial influence of the trees, and would be reduced in vigor or competitive ability. Some species survive in the understory, but when released from the influence of the forest, become vigorous competitors for growth space. Examples are huckleberries and western hemlocks. Other species are not notable in the forest understory (including some trees, such as Sitka spruce), but are able to develop rapidly from seed in open conditions.

Conditions on a newly opened site are changed by the vegetation that grows there, and the changed conditions favor a different vegetation composition. Within 10 to 30 years a closed canopy forest occupies the site. Such a forest stand would mature in about 100 years and reach the climax stage in 300 to 500 years. This succession process operates when the forest is removed by natural events or by timber harvest. No effect on vegetation outside these natural processes would result from any of the action alternatives. The required application of the Standards and Guidelines will protect the productivity of a site, while no such protection applies to natural events that remove a forest stand.

## Timber

Section 4, pages 4-1 through 4-12 of the “1986-90 Operating Period for the Alaska Pulp Corporation Long-Term Sale Area FEIS” (1986-90 FEIS) (Forest Service 1986b) has a detailed discussion about the environmental consequences on commercial forest land resulting from the removal of stands of timber from the APC Contract area. This section supplements that section of the 1986-90 FEIS. Following is a discussion of the effects of timber harvest and of regeneration and precommercial thinning on commercial forest land. The effects of timber harvest on mature and overmature stands is considered long term and is discussed below under reasonably foreseeable, long-term and cumulative effects.

Each action alternative distributes the proposed harvest in specific VCUs in Analysis Area 12. Tables 2-1 through 2-4 summarized the amount of timber proposed for harvest under each alternative by VCU. Each action alternative would result in harvest in VCUs 399, 400, 402, 420, and 421. In addition, Alternative 5 proposes harvest in VCU 419 while Alternative 3 proposes harvest in VCUs 417 and 418, (deferred portion of east Kuiu). The No Action Alternative proposes no further harvesting in any of the VCUs, at least until the end of the 1986-90 Operating Period.

Although the alternatives differ somewhat in their distribution of harvest among VCUs, they propose similar levels of harvest for Analysis Area 12 as a whole (Table 4-3). As a result, the percentage of operable CFL proposed for harvest under each alternative differs very little. The proposed harvest ranges from 2,585 acres (less than 2.7 percent of the normal operable CFL in Analysis Area 12) for Alternative 2 to 3,110 acres (less than 3.2 percent of the normal operable CFL) for Alternative 3. The combined harvest of normal operable CFL (all past harvest plus the proposed) would range from 26.3 to 26.8 percent for Alternatives 2 through 5, a 0.5 percentage point difference. Cumulative harvest would be 16.1 to 16.4 percent of the total operable CFL and only 9.6 to 9.8 percent of the total land base in Analysis Area 12. In comparison, the cumulative harvest of the No Action Alternative would be 23.6 percent of normal operable CFL, 14.5 percent of the total operable CFL, and 8.6 percent of the total land base of Analysis Area 12. Because of the stringent standards and guidelines applied to the harvest of timber in the Tongass National Forest (SE Alaska Regional Guide, APC Contract, and Unit Layout Cards), no perceptible impacts on the productivity of forest lands are expected. Monitoring and the effectiveness of mitigation are discussed in Consolidated Appendix, Volume III, J. Effectiveness of this monitoring has resulted in numerous unit design changes as discussed in the Timber section of Chapter 3.

Table 4-3

### Effects of Harvest on Land Base, CFL, Operable CFL, and Normal Operable CFL

	Alternative				
	1	2	3	4	5
Cumulative					
Harvest Acres	20,869	23,454	23,979	23,515	23,824
Percent Normal					
Operable CFL	19.6	22.0	22.5	22.1	22.3
Percent Operable CFL	12.2	13.7	14.0	13.7	13.9
Percent CFL	11.6	13.0	13.3	13.0	13.2
Percent Land Base	7.0	7.9	8.1	7.9	8.0

SOURCE: Tongass Land Management Plan aerial photo points inventory, Forest Service Region 10, Juneau, AK.





The Forest Service is required by law, regulation, and policy to plan harvest of timber only where there is assurance that such land can be regenerated within five years after harvest is completed. Current management prescriptions for harvest units on Kuiu Island indicate natural regeneration will continue to restock most clearcut-harvested stands. Artificial regeneration by hand planting serves as the back up method for stands that cannot be certified as adequately regenerated within five years. To date, no hand planting has been required on north Kuiu Island, and none is anticipated for the future. Burning can be used to prepare sites for natural regeneration establishment. Some areas may also be broadcast burned if management direction and silvicultural prescriptions indicate a need to reduce fuel concentrations. Burning also shows some promise as a measure to improve the wildlife habitat of a second-growth stand where logging debris is an impediment.

In Southeast Alaska, 50 years of experience has demonstrated clearcutting to be successful and the most cost-effective method of facilitating regeneration of commercial forest species. Although the term clearcut appears to contradict the regeneration concept, this is not the case in the Southeast Alaska spruce/hemlock forest ecosystem where clearcutting results in prolific tree production. Tree production in such exposed areas can be so thick that precommercial thinning is required to reduce stand stocking levels to less than 200 stems per acre. Shallow soils and severe weather conditions have resulted in windthrow where selective and shelter-wood harvest systems have been attempted.

There are many advantages to reducing natural conifer stocking levels from 3,000 trees per acre by precommercial thinning. Short-term benefits include employment and increased, higher quality habitat for some wildlife species than would be provided in unthinned second-growth stands. Long-term benefits are primarily centered around reducing the competition for sunlight by the plant community. This results in the understory and the remaining conifers growing at accelerated rates for longer time periods than unthinned second-growth stands. This translates into higher forage values to wildlife, higher sawlog volume, and faster successional change, thus providing climax stand conditions sooner than would be provided by unthinned second-growth stands.

## Wildlife

Information from the Affected Environment Section (Chapter 3) provides the basis to evaluate impacts on the various wildlife species and habitats. The analysis of impacts focuses on the emphasis species and emphasis habitats discussed in Chapter 3. The analysis provided below considers the alternatives along with general and site-specific differences and similarities among them. It also considers both the impacts of the alternatives and the combined impacts of all past timber harvest in Analysis Area 12. Effects on wildlife habitats are discussed first, followed by a discussion of the effects on the wildlife species. The Unit Cards in Appendix A-1 document which specific harvest units affect which types of habitat. They also list the specific mitigation measures will be applied to those units.

### Wildlife Habitats

Timber harvest activities proposed in all the action alternatives would generally result in the loss of existing wildlife habitat values. In those affected habitats, most or all immobile species and life stages, or species with small home ranges could be directly lost. Resident and migratory species dependent upon those habitats would be forced to relocate to adjacent areas. Those displaced animals would increase the competition for food and cover in the remaining habitats. Where the population of a wildlife species is near the carrying capacity of the habitat, the population would be reduced to the number the remaining habitat could support or to a lower number if the increased competition caused degradation of the habitat.

All of the alternatives, except the no action, include harvest of some additional wildlife habitat. Many of the harvest units are common to several or all the action alternatives, and the effects of the alternatives on wildlife habitat are also similar. The location of the impacts shifts somewhat around the Analysis Area as the harvest units unique to the alternatives are added



and subtracted. For example, Alternative 2 affects more deer winter range (primarily in VCU 400) than the other alternatives, as harvest units are located on the west side of Security Bay. Only Alternative 5 affects habitats in VCU 419, as a cluster of units is located on the north side of Threemile Arm; only Alternative 3 affects habitats in VCUs 417 and 418.

Acres of forested habitat that would be altered by harvest in each alternative are presented in Table 4-4. The amount varies from 0 to 912 acres in separate VCUs. Forested habitat includes all acres of commercial forest land. The other emphasis habitats are also included within the larger category of forested habitat. For the forested habitat, the percent remaining at the end of the timber harvest projected through December 31, 1990 would range from 75 percent in VCU 398 for all alternatives to 100 percent in three VCUs for all alternatives (Table 4-5).

The changes in emphasis habitats for each alternative are discussed below. The data on acres affected and acres remaining are derived from planning records for the Tongass Land Management Plan (TLMP), the 1986-90 FEIS, and ongoing planning records in the Stikine Area Office. The tables that show acres of wildlife habitats remaining account for all timber harvest completed as of September 1988 and all harvest authorized through December 31, 1990

Table 4-4

## Forested Habitat Affected by Alternative

VCU	1	2	3	4	5
<i>Acres Affected</i>					
399	0	315	315	438	438
400	0	661	208	208	208
402	0	290	290	365	365
417	0	0	456	0	0
418	0	0	206	0	0
419	0	0	0	0	309
420	0	723	723	723	723
421	0	596	912	912	912
Total	0	2,585	3,110	2,646	2,955
<i>Percent Affected</i>					
399	0	2	2	2	2
400	0	3	1	1	1
402	0	1	1	2	2
417	0	0	5	0	0
418	0	0	3	0	0
419	0	0	0	0	3
420	0	5	5	5	5
421	0	3	4	4	4
Total <sup>1</sup>	0	1	2	1	2

SOURCE: SEIS Planning Record.

<sup>1</sup> This value represents the percent of pre-harvest habitat affected in the entire analysis area.

Table 4-5

**Forested Habitat Remaining by Alternative**

VCU	1	2	3	4	5
<i>Acres Remaining</i>					
398	3,741	3,741	3,741	3,741	3,741
399	16,879	16,564	16,564	16,441	16,441
400	18,133	17,472	17,925	17,925	17,925
401	8,213	8,213	8,213	8,213	8,213
402	15,586	15,296	15,296	15,221	15,221
403	17,922	17,922	17,922	17,922	17,922
405.1	1,056	1,056	1,056	1,056	1,056
416	13,403	13,403	13,403	13,403	13,403
417	8,668	8,668	8,212	8,668	8,668
418	6,536	6,536	6,330	6,536	6,536
419	9,788	9,788	9,788	9,788	9,479
420	15,489	14,766	14,766	14,766	14,766
421	17,533	16,937	16,621	16,621	16,621
427	2,080	2,080	2,080	2,080	2,080
428	9,357	9,357	9,357	9,357	9,357
Total	164,384	161,799	161,274	161,738	161,429
<i>Percent Remaining</i>					
398	75	75	75	75	75
399	81	80	80	79	79
400	82	79	81	81	81
401	100	100	100	100	100
402	78	76	76	76	76
403	98	98	98	98	98
405.1	100	100	100	100	100
416	98	98	98	98	98
417	95	95	90	95	95
418	98	98	95	98	98
419	90	90	90	90	87
420	98	93	93	93	93
421	80	77	75	75	75
427	96	96	96	96	96
428	100	100	100	100	100
Total <sup>2</sup>	89	87	87	87	87

SOURCE: SEIS Planning Record.

<sup>1</sup> Includes all harvest plans through the 1990 harvest season.

<sup>2</sup> This value represents the percent of pre-harvest habitat remaining in the entire analysis area.

as well as harvest proposed under the alternatives. The information presented in the tables is a summary of data available on the Unit Cards which are displayed in Appendix A-1. Unit Cards list the acres of specific habitat type that would be affected by that harvest unit and associated roads. Unit numbers can be located on the Alternative Maps included in this SEIS to determine the specific locations within the VCUs where the effects would occur. The GIS database, which is included in the planning records, contains digital maps of the various wildlife habitat types as well as the proposed harvest units and roads. The entire Planning Record is incorporated, by reference, into this supplement.

## Deer Winter Range

Acres of deer winter range that would be harvested by each alternative are presented in Table 4-6. The amount ranges from 0 in many VCUs to 490 acres in VCU 400 with Alternative 2. The percentage reduction within a given VCU ranges from 0 to 5 percent with the different alternatives. The greatest amount of deer winter range would be altered by harvest with Alternative 2 and the least with Alternatives 4 and 5 (307 acres).

Deer winter range remaining following timber harvest (Table 4-7) would range from 100 percent for all alternatives in VCU 401 and the VCUs without proposed harvest to 69 percent for Alternatives 4 and 5 in VCU 402. The amount of winter range remaining would be similar for all alternatives and range between approximately 71,400 acres and 71,900 acres. Capability of this habitat to produce deer is discussed in the section on the results from the deer model.

Table 4-6

### Deer Winter Range Affected by Alternative

VCU <sup>3</sup>	1	2	3	4	5
<i>Acres Affected</i>					
400	0	490	148	148	148
402	0	55	55	115	115
417	0	0	56	0	0
418	0	0	105	0	0
420	0	28	28	28	28
421	0	0	16	16	16
Total	0	573	408	307	307
<i>Percent Affected</i>					
400	0	3	1	1	1
402	0	1	1	3	3
417	0	0	1	0	0
418	0	0	5	0	0
420	0	— <sup>1</sup>	— <sup>1</sup>	— <sup>1</sup>	— <sup>1</sup>
421	0	0	— <sup>1</sup>	— <sup>1</sup>	— <sup>1</sup>
Total <sup>2</sup>	0	7	5	4	4

SOURCE: SEIS Planning Record.

<sup>1</sup> Deer winter range affected is less than one percent.

<sup>2</sup> This value represents the percent of pre-harvest habitat affected in the entire analysis area.

<sup>3</sup> No other VCUs are affected by any of the alternatives.



Table 4-7

**Deer Winter Range Remaining by Alternative<sup>1</sup>**

VCU	1	2	3	4	5
<i>Acres Remaining</i>					
398	2,762	2,762	2,762	2,762	2,762
399	2,301	2,301	2,301	2,301	2,301
400	11,267	10,777	11,119	11,119	11,119
401	5,846	5,846	5,846	5,846	5,846
402	3,198	3,143	3,143	3,083	3,083
403	12,761	12,761	12,761	12,761	12,761
405.1	64	64	64	64	64
416	5,136	5,136	5,136	5,136	5,136
417	4,368	4,368	4,312	4,368	4,368
418	2,134	2,134	2,029	2,134	2,134
419	2,989	2,989	2,989	2,989	2,989
420	6,628	6,600	6,600	6,600	6,600
421	1,970	1,970	1,954	1,954	1,954
427	1,350	1,350	1,350	1,350	1,350
428	9,200	9,200	9,200	9,200	9,200
Total	71,974	71,401	71,566	71,667	71,667
<i>Percent Remaining</i>					
398	100	100	100	100	100
399	85	85	85	85	85
400	79	76	78	78	78
401	100	100	100	100	100
402	71	70	70	69	69
403	100	100	100	100	100
405.1	100	100	100	100	100
416	97	97	97	97	97
417	93	93	91	93	93
418	97	97	93	97	97
419	84	84	84	84	84
420	98	97	97	97	97
421	85	85	84	84	84
427	100	100	100	100	100
428	100	100	100	100	100
Total <sup>2</sup>	92	91	91	92	92

SOURCE: SEIS Planning Record.

<sup>1</sup> Includes all harvest plans through the 1990 harvest season.

<sup>2</sup> This value represents the percent of pre-harvest habitat remaining in the entire analysis area.

# 4 Environmental Consequences

Beach Fringe, Estuarine Habitat



## Inland Wetland

Acres of inland wetland habitat that would be altered by harvest in each alternative is presented in Table 4-8. The amount ranges from 0 in most VCUs to 152 acres in VCU 417 with Alternative 3. The greatest amount of inland wetland habitat (152 acres or 1 percent of the total existing) would be altered by harvest with Alternative 3. No inland wetland habitat would be altered by harvest with Alternative 2. The percent of original inland wetland habitat remaining would range from 87 percent for Alternatives 3, 4, and 5 in VCU 421 to 100 percent for all alternatives in VCUs 403, 405.1, 416, and 420, and Alternatives 1, 2, 3, and 4 in VCU 419 (See Table 4-9).

Table 4-8

### Inland Wetland Habitat Affected by Alternative

VCU <sup>3</sup>	1	2	3	4	5
<i>Acres Affected</i>					
417	0	0	152	0	0
418	0	0	12	0	0
419	0	0	0	0	24
421	0	0	40	40	40
Total	0	0	204	40	64
<i>Percent Affected</i>					
417	0	0	11	0	0
418	0	0	1	0	0
419	0	0	0	0	2
421	0	0	2	2	2
Total <sup>1</sup>	0	0	1	— <sup>2</sup>	— <sup>2</sup>

SOURCE: SEIS Planning Record.

<sup>1</sup> This value represents the percent of pre-harvest habitat affected in the entire analysis area.

<sup>2</sup> Inland wetland habitat affected is less than one percent.

<sup>3</sup> No other VCUs are affected by any of the alternatives.

Table 4-9

**Inland Wetland Habitat Remaining by Alternative<sup>1</sup>**

VCU	1	2	3	4	5
<i>Acres Remaining</i>					
398	— <sup>2</sup>	— <sup>2</sup>	— <sup>2</sup>	— <sup>2</sup>	— <sup>2</sup>
399	1,714	1,714	1,714	1,714	1,714
400	644	644	644	644	644
401	— <sup>2</sup>	— <sup>2</sup>	— <sup>2</sup>	— <sup>2</sup>	— <sup>2</sup>
402	680	680	680	680	680
403	3,351	3,351	3,351	3,351	3,351
405.1	160	160	160	160	160
416	720	720	720	720	720
417	1,340	1,340	1,188	1,340	1,340
418	1,110	1,110	1,098	1,110	1,110
419	1,120	1,120	1,120	1,120	1,096
420	2,940	2,940	2,940	2,940	2,940
421	1,784	1,784	1,744	1,744	1,744
427	— <sup>2</sup>	— <sup>2</sup>	— <sup>2</sup>	— <sup>2</sup>	— <sup>2</sup>
428	— <sup>2</sup>	— <sup>2</sup>	— <sup>2</sup>	— <sup>2</sup>	— <sup>2</sup>
Total	15,563	15,563	15,359	15,523	15,499
<i>Percent Remaining</i>					
398	— <sup>2</sup>	— <sup>2</sup>	— <sup>2</sup>	— <sup>2</sup>	— <sup>2</sup>
399	95	95	95	95	95
400	91	91	91	91	91
401	— <sup>2</sup>	— <sup>2</sup>	— <sup>2</sup>	— <sup>2</sup>	— <sup>2</sup>
402	91	91	91	91	91
403	100	100	100	100	100
405.1	100	100	100	100	100
416	100	100	100	100	100
417	100	100	89	100	100
418	97	97	95	97	97
419	100	100	100	100	98
420	100	100	100	100	100
421	89	89	87	87	87
427	— <sup>2</sup>	— <sup>2</sup>	— <sup>2</sup>	— <sup>2</sup>	— <sup>2</sup>
428	— <sup>2</sup>	— <sup>2</sup>	— <sup>2</sup>	— <sup>2</sup>	— <sup>2</sup>
Total <sup>3</sup>	97	97	96	97	97

SOURCE: SEIS Planning Record.

<sup>1</sup> Includes all harvest plans through the 1990 harvest season.

<sup>2</sup> None of this habitat was found in the inventory.

<sup>3</sup> This value represents the percent of pre-harvest habitat remaining in the entire analysis area.



## Beach Fringe

None of the beach fringe habitat would be altered by timber harvest in any of the current alternatives. Six acres would be altered by road construction under Alternative 2.

The percent of original beach fringe habitat remaining would range from 81 percent for VCU 419 to 100 percent for VCUs 401, 427, and 428. There is little difference between the alternatives as none propose to harvest in the beach fringe habitat areas. Reductions in the amount of beach fringe are the result of previous logging. Construction of a log transfer facility at No Name Bay for Alternative 3 would result in removal of 8 to 10 acres of beach fringe habitat. The habitat is of lower quality, however, due to the high percentage of blowdown. Road construction to access the west side of Security Bay under Alternative 2 would remove 6 acres of beach fringe. This would be partially mitigated by using special seaward clearing limits and locating the road as far back as practical from the beach.

## Estuarine Fringe

None of these habitats would be altered by timber harvest in any of the current alternatives. Eighteen acres would be altered by road construction under Alternative 2.

The percent of original estuarine fringe habitat remaining would range from 93 percent in VCU 419 to 100 percent in four VCUs. There is little difference between the alternatives as none propose to harvest timber in estuarine fringe habitat. Road construction to access the west side of Security Bay in Alternative 2 would remove 18 acres of estuarine fringe habitat. This would be partially mitigated by the application of special seaward clearing limits and by locating the road as far back as practical from the estuary.

## Streamside Riparian

Acres of streamside riparian habitat that would be altered by harvest for each alternative are shown in Table 4-10. The amount ranges from 0 acres in many VCUs to 8 acres in VCU 402 with Alternatives 2 through 5 and VCU 419 with Alternative 5. The affected amount ranges from 2 to 5 percent.

The percent of original streamside riparian habitat remaining would range from 93 percent for Alternative 5 in VCU 419 to 100 percent for many of the VCUs in all of the alternatives. (Table 4-11). Actually, very little of the streamside riparian is located in planned harvest units. It included 8 acres of habitat in VCU 402 for all the action alternatives, with an additional 8 acres in VCU 419 for Alternative 5.

Table 4-10

### Streamside Riparian Habitat Affected by Alternative

VCU <sup>1</sup>	1	2	3	4	5
<i>Acres Affected</i>					
402	0	8	8	8	8
419	0	0	0	0	8
Total	0	8	8	8	16
<i>Percent Affected</i>					
402	0	2	2	2	2
419	0	0	0	0	5
Total <sup>2</sup>	0	— <sup>3</sup>	— <sup>3</sup>	— <sup>3</sup>	— <sup>3</sup>

SOURCE: SEIS Planning Record.

<sup>1</sup> No other VCUs are affected by any of the alternatives.

<sup>2</sup> This value represents the percent of pre-harvest habitat affected in the entire analysis area.

<sup>3</sup> Streamside riparian habitat affected is less than one percent.

Table 4-11

**Streamside Riparian Habitat Remaining by Alternative<sup>1</sup>**

VCU	1	2	3	4	5
<i>Acres Remaining</i>					
398	— <sup>2</sup>	— <sup>2</sup>	— <sup>2</sup>	— <sup>2</sup>	— <sup>2</sup>
399	115	115	115	115	115
400	144	144	144	144	144
401	— <sup>2</sup>	— <sup>2</sup>	— <sup>2</sup>	— <sup>2</sup>	— <sup>2</sup>
402	384	376	376	376	376
403	67	67	67	67	67
405.1	112	112	112	112	112
416	472	472	472	472	472
417	— <sup>2</sup>	— <sup>2</sup>	— <sup>2</sup>	— <sup>2</sup>	— <sup>2</sup>
418	92	92	92	92	92
419	157	157	157	157	149
420	64	64	64	64	64
421	69	69	69	69	69
427	— <sup>2</sup>	— <sup>2</sup>	— <sup>2</sup>	— <sup>2</sup>	— <sup>2</sup>
428	— <sup>2</sup>	— <sup>2</sup>	— <sup>2</sup>	— <sup>2</sup>	— <sup>2</sup>
Total	1,676	1,668	1,668	1,668	1,660
<i>Percent Remaining</i>					
398	100	100	100	100	100
399	100	100	100	100	100
400	100	100	100	100	100
401	100	100	100	100	100
402	98	96	96	96	96
403	100	100	100	100	100
405.1	100	100	100	100	100
416	97	97	97	97	97
417	— <sup>2</sup>	— <sup>2</sup>	— <sup>2</sup>	— <sup>2</sup>	— <sup>2</sup>
418	96	96	96	96	96
419	98	98	98	98	93
420	100	100	100	100	100
421	100	100	100	100	100
427	100	100	100	100	100
428	100	100	100	100	100
Total <sup>3</sup>	98	98	98	98	97

SOURCE: SEIS Planning Record.

<sup>1</sup> Includes all harvest plans through the 1990 harvest season.

<sup>2</sup> None of this habitat was found in the inventory.

<sup>3</sup> This value represents the percent of pre-harvest habitat remaining in the entire analysis area.

# 4 Environmental Consequences

## Old Growth, Streamside Riparian Habitat



### Old-Growth Conditions

The 1986-90 FEIS identified some forest areas that were prescribed as old-growth habitat conditions. Table 4-12 shows the amount of prescribed old-growth habitat conditions and the amount remaining following proposed timber harvest alternatives. The No Action Alternative does not propose additional harvest within this habitat. Alternative 2, which provides new

Table 4-12

### Old-Growth Habitat Affected by Alternative in Acres

VCU <sup>1</sup>	Old Growth Conditions <sup>2</sup>	Alternative				
		1	2	3	4	5
399	4,556	0	0	0	0	0
400	7,123	0	445	54	54	54
402	4,922	0	28	28	73	73
416	4,449	0	0	0	0	0
417	3,583	0	0	13	0	0
418	2,142	0	0	5	0	0
419	3,037	0	0	0	0	39
420	6,757	0	26	26	26	26
421	2,644	0	0	12	12	12
Total	39,213	0	499	138	165	204

SOURCE: SEIS Planning Record.

NOTE: See the Alternative maps included with this document.

<sup>1</sup> Information for other VCUs is not available.

<sup>2</sup> Habitat acres prescribed in the 1986-90 FEIS (Forest Service 1986b).



road access to the west Security Bay area (VCU 400), would have the greatest effect on prescribed old-growth conditions. Approximately 500 acres are proposed for timber harvest, of which 445 acres would be in west Security Bay. All the other alternatives propose only 54 acres of harvest in this area with the remaining harvest proposed in VCUs 402, 419, 420, and 421. Alternative 3 proposes a small amount of harvest in VCU 417 (13 acres) and VCU 418 (5 acres).

It is important to note that if all proposed timber harvest in any action alternative were implemented, approximately 99 percent of the existing prescribed old-growth habitat conditions would still remain. Additional habitat of equivalent quality also exists in areas where no old-growth conditions were prescribed. The 1986-90 FEIS did not evaluate all of the VCUs within Analysis Area 12 for purposes of prescribing old-growth habitat conditions. VCUs 398, 401, 403, 427, and 428, as shown on the 1986-90 maps, contain no such prescription. Of these VCUs, 403, 427, and 428 are LUD IIs under TLMP and were also not considered for further evaluation in the Supplement (See "Management of the Analysis Area" in Chapter 1). Development activities in VCU 398 and 401 were deferred in the 1986-90 FEIS for future planning. No development activities are being considered in any of these VCUs at this time. Therefore, these VCUs are not evaluated for old-growth prescriptions in the Supplement process.

### Emphasis Species

The changes to wildlife habitats discussed above would have an effect on the wildlife that use those habitats. Emphasis species have been selected to identify those effects and allow some comparison to how the other wildlife may be affected. In addition to a discussion of timber harvest impacts resulting from the alternatives, information is provided below concerning deer and pine marten habitat capability.

#### Black-tailed Deer

The Sitka black-tailed deer utilizes all habitats within Analysis Area 12. The quality of habitats in close proximity to the shoreline is believed to be the most critical factor limiting survival of the black-tailed deer during severe winters. Timber harvest in this habitat could affect deer population numbers during severe winters, at least until suitable vegetation is re-established.

The proposed timber harvest alternatives would have approximately the same effect on all wildlife habitats. Alternative 2 proposes a new road system into west Security Bay and the harvest of approximately 500 acres of prescribed old-growth habitat. Although this habitat is important to black-tailed deer and old-growth dependent species, the harvest proposed represents 6 percent of the existing prescribed old-growth in VCU 400 and 1.3 percent in the entire Analysis Area. The other alternatives propose between 100 and 200 acres of old-growth harvest with none proposed in west Security Bay.

A deer habitat capability model was used to estimate potential effects of management activities on deer numbers. The model, which is described in the Consolidated Appendix, Volume III, E-1, evaluates factors such as vegetative species, volume class, successional stage, slope, aspect, and elevation as a means of predicting potential effects on deer herds.

The habitat capability model information indicates that less than a 2 percent potential reduction in deer numbers may be expected from the proposed timber harvest alternatives (Table 4-13). In some alternatives the potential reduction approaches close to 1 percent. This potential reduction represents a range of 90 to 135 animals in a potential population of 9,400 (Table 4-14).

Only minor effects on Sitka black-tailed deer are expected from the proposed harvest activities due to the following reasons:

- Minor reduction in deer habitat carrying capacity,
- Low level of existing population, and
- Large acreage of deer habitat remaining.

Table 4-13

## Projected Percent Reduction of Potential Deer Numbers Based on a Sitka Black-tailed Deer Habitat Capability Model

VCU	Previous Change <sup>1</sup>	Alternative				
		1	2	3	4	5
<i>Minor Harvest Area 2012</i>						
398	11.1	0	0	0	0	0
399	7.1	0	1.1	1.1	1.6	1.6
400	11.5	0	2.4	0.8	0.8	0.8
401	0	0	0	0	0	0
402	8.9	0	0	0.4	0.7	0.7
421	11.9	0	2.6	7.5	7.5	7.5
Subtotal <sup>2</sup>	8.5	0	1.0	1.8	1.9	1.9
<i>Minor Harvest Area 2013</i>						
403	0	0	0	0	0	0
420	33.7	0	3.1	3.1	3.1	3.1
Subtotal <sup>2</sup>	18.3	0	1.7	1.7	1.7	1.7
<i>Minor Harvest Area 2014</i>						
416	1.0	0	0	0	0	0
417	3.5	0	0	6.2	0	0
418	1.0	0	0	7.1	0	0
419	7.5	0	0	0	0	3.6
427	0	0	0	0	0	0
428	0	0	0	0	0	0
Subtotal <sup>2</sup>	2.0	0	0	1.5	0	0.5
Total <sup>3</sup>	8.5	0	0.9	1.6	1.3	1.4

SOURCE: Forest Service in consultation with ADF&G (SEIS Planning Record). See Consolidated Appendix, Volume II, C-3, theme response on data adequacy and use of models.

<sup>1</sup> Numbers reflect changes in deer habitat capability resulting from previous timber harvest including Court authorized harvest through 1989.

<sup>2</sup> This value represents the percent reduction in the entire minor harvest area.

<sup>3</sup> This value represents the percent reduction in the entire analysis area.

Table 4-14

**Projected Reduction of Potential Deer Numbers Based on a Sitka Black-tailed Deer Habitat Capability Model**

VCU	Present Deer Habitat Capability	Alternative				
		1	2	3	4	5
Minor Harvest Area 2012						
398	337	0	0	0	0	0
399	1,226	0	15	15	21	21
400	735	0	20	7	7	7
401	572	0	0	0	0	0
402	1,452	0	0	7	11	11
421	755	0	22	64	64	64
Subtotal	5,077	0	57	93	103	103
Minor Harvest Area 2013						
403	858	0	0	0	0	0
420	670	0	31	31	31	31
Subtotal	1,528	0	31	31	31	31
Minor Harvest Area 2014						
416	1,264	0	0	0	0	0
417	418	0	0	27	0	0
418	209	0	0	15	0	0
419	332	0	0	0	0	13
427	144	0	0	0	0	0
428	409	0	0	0	0	0
Subtotal	2,776	0	0	42	0	13
Total	9,381	0	88	166	134	147

Source: Forest Service in consultation with ADF&G (SEIS Planning Record). See Consolidated Appendix, Volume II, C-3, theme response on data adequacy and use of models.



## Black Bear

Black bear populations on Kuiu Island are estimated to be high. Black bear are relatively tolerant of the habitat changes, noise and structures associated with development. Work by Alaback (1984) suggests that timber harvesting has a neutral effect on forage availability, however a long-term reduction in potential denning sites is possible.

Since no harvest is proposed in the important beach fringe and streamside riparian habitats and over 95 percent of the pre-harvest habitats would remain under all alternatives, no short- or long-term impacts to black bear cover or forage are anticipated.

A potential long term impact is that bear/human encounters may increase as road access increases. The increase in human presence required in harvesting operations can lead to unnecessary nuisance bear kills especially when garbage dumps are not properly maintained. Use of incinerators, which is required under the terms of the timber sale contract, should eliminate most if not all of these encounters. An expanded road network will increase access for both sport and subsistence bear hunters.

The roads required to implement proposed harvests would increase opportunities for bear/human encounters and demand for sport hunting to some degree. Minor increases in illegal bear harvest could also be expected. The greatest potential increase in sport hunting would be anticipated under Alternative 2, due to the importance of Security Bay as a black bear hunting area for guided nonresidents. The remoteness of Kuiu Island would limit hunting pressures normally associated with recently accessed areas in more populated settings.

## Pine Marten

The pine marten uses forested old-growth, beach fringe, and streamside riparian habitats. The timber harvest alternatives would result in few effects on beach fringe and streamside riparian. Over 99 percent of old-growth and 87 percent of forested habitats would remain.

The habitat capability model information indicates that the reduction in pine marten numbers would range from 1.4 percent in Alternatives 4 and 5, to just under 5 percent in Alternative 3 (Table 4-15). This potential reduction represents approximately 7 to 25 animals in a potential population of 515 (Table 4-16). The pine marten habitat capability model is displayed in Consolidated Appendix, Volume III, E-3. The model evaluates timber stand ages, volume classes, elevation, and the effects of roads open to public access which may be used by trappers operating under current State trapping regulations. The model is used to estimate the effects on potential carrying capacity of marten by harvest alternative.

## Land Otter

Land otters generally occur close to the beach using beach fringe and streamside riparian habitats. The proposed harvest alternatives would have minor effects on either of these habitats.

There is very little proposed harvest and over 95 percent of all habitat would remain.

## Bald Eagle

Bald eagles use beach fringe, estuarine fringe, and streamside riparian habitats. No eagle nest trees would be affected by any of the proposed alternatives.

## Vancouver Canada Goose

Vancouver Canada Geese are unique among all subspecies of Canada geese in that they use forested habitat for nesting and brood rearing. Timber harvest activities in estuarine fringe, inland wetland, and forested habitats could affect these geese. The harvest levels proposed on the inland wetland and surrounding forest would result in no major effects. No harvest is proposed in the estuarine fringe and over 96 percent of inland-wetland and 87 percent of forested habitats would remain.

Table 4-15

**Projected Percent Reduction of Potential Pine Marten Numbers  
Based on a Habitat Capability Model**

VCU	Previous Change <sup>1</sup>	1	2	Alternative 3	4	5
<i>Minor Harvest Area 2012</i>						
398	10.5	0	0	0	0	0
399	90.4	0	1.2	1.2	0	0
400	91.2	0	0	0	0	0
401	0	0	0	0	0	0
402	91.1	0	0	0	0	0
421	91.4	0	0	0	1.0	0
Subtotal <sup>2</sup>	76.3	0	— <sup>3</sup>	— <sup>3</sup>	— <sup>3</sup>	0
<i>Minor Harvest Area 2013</i>						
403	0	0	0	0	0	0
420	2.5	0	8.6	8.6	7.4	7.4
Subtotal <sup>2</sup>	1.1	0	3.7	3.7	3.2	3.2
<i>Minor Harvest Area 2014</i>						
416	1.4	0	0	0	0	0
417	2.3	0	0	38.6	0	0
418	4.0	0	0	0	0	0
419	38.1	0	0	0	0	2.4
427	0	0	0	0	0	0
428	0	0	0	0	0	0
Subtotal <sup>2</sup>	7.9	0	0	7.1	0	0.4
Total <sup>4</sup>	41.9	0	0.9	2.8	1.0	1.0

SOURCE: Forest Service in consultation with ADF&G (SEIS Planning Record). See Consolidated Appendix, Volume II, C-3, theme response on data adequacy and use of models.

<sup>1</sup> Numbers reflect changes in pine marten habitat capability resulting from previous timber harvest including Court authorized harvest through 1989.

<sup>2</sup> This value represents the percent reduction in the entire minor harvest area.

<sup>3</sup> Percent reduction is less than one percent.

<sup>4</sup> This value represents the percent reduction in the entire analysis area.

Table 4-16

## Projected Reduction of Potential Pine Marten Numbers Based on a Habitat Capability Model

VCU	Present Pine Marten Habitat Capability	Alternative				
		1	2	3	4	5
Minor Harvest Area 2012						
398	34	0	0	0	0	0
399	8	0	1	1	0	0
400	8	0	0	0	0	0
401	41	0	0	0	0	0
402	9	0	0	0	0	0
421	9	0	0	0	1	0
Subtotal	109	0	1	1	1	0
Minor Harvest Area 2013						
403	106	0	0	0	0	0
420	79	0	7	7	6	6
Subtotal	185	0	7	7	6	6
Minor Harvest Area 2014						
416	70	0	0	0	0	0
417	43	0	0	17	0	0
418	24	0	0	0	0	0
419	26	0	0	0	0	1
427	12	0	0	0	0	0
428	46	0	0	0	0	0
Subtotal	221	0	0	17	0	1
Total	515	0	8	25	7	7

SOURCE: Forest Service in consultation with ADF&G (SEIS Planning Record). See Consolidated Appendix, Volume II, C-3, theme response on data adequacy and use of models.



### Conclusions for Wildlife Effects

No major effects from timber harvest activities are expected on either the wildlife or their habitats. Evaluation of the entire Analysis Area reveals less than 5 percent of the overall habitats would be affected. Many of the effects would be less than 1 percent or even unmeasurable. Habitat capability models for the Sitka black-tailed deer and pine marten also show less than a 3 percent potential reduction in actual numbers due to timber harvest activities.

## Fisheries

Each of the four action alternatives has potential for impacting the aquatic habitat in Analysis Area 12, but the level of impact, if any, is dependent upon the application of Best Management Practices (BMPs) and AHMU Standards and Guidelines. Timber harvest adjacent to streams could affect water temperature and debris recruitment; road construction and use could cause increased sedimentation; and installation of road crossings could alter or eliminate access to anadromous fish habitat. Timber harvest standards and guidelines are applied to minimize each of these potential impacts. Studies on the Indian River and Kadashan River watersheds (Paustian 1988) detected little impact from road building or timber harvesting.

An initial site survey of 51 stream sites on Prince of Wales Island, near the end of the unusually warm and dry summer of 1989, found fish kills in streams in both logged and unlogged drainages. The study tried to relate the fish kills to factors such as low flows, high water temperature, low dissolved oxygen in the water, and/or the indirect effect of past logging. Water flows were at, or near, historic lows. Preliminary results indicate no relationship between logging and water temperatures or fish kills.

The potential for impacts increases as the disturbance increases along streams. The proposed timber harvest adjacent to streams by VCU for each alternative is summarized in Tables 4-17 through 4-20. The total proposed timber harvest with buffer prescriptions (means trees are left standing along the stream according to AHMU prescriptions) along both Class I and II streams ranges from 7.5 miles for Alternative 4 to 10.4 miles for Alternative 3. The location



of proposed harvest units in relation to Class I and II AHMUs can be seen in the reproduced aerial photos on the back of the Unit Cards in Appendix A-1, or on the Alternative Maps provided with this SEIS. The maps show more clearly where streams are located and where breaks between AHMU stream classifications occur.

The proposed construction of new roads and new stream crossings that will require application of prescriptions listed in the Aquatic Habitat Management Unit (AHMU) handbook are summarized by alternative in Tables 4-21 and 4-22. No new roads are planned within AHMUs for Alternatives 2 and 4. Alternatives 3 and 5 propose 1.0 and 0.3 miles of new roads, respectively, that would parallel Class I stream habitat. No roads are proposed along Class II streams. The proposed number of road crossings of Class I streams ranges from one for Alternative 2 to four for Alternative 3. The number of crossings of Class II streams ranges from one for Alternatives 3, 4, and 5 to three for Alternative 2 (see Table 4-22).

## Conclusions for Fish Habitat Effects

The potential effects of the proposed alternative timber harvest plans on aquatic habitat should be minimized or eliminated by application of the Forest Service standards and guidelines and the prescriptions, which are described in detail in the Aquatic Habitat Management Handbook (Forest Service 1986a). Standard AHMU prescriptions are described that will protect water quality and the productivity of fish habitat. The prescriptions help ensure attainment of management goals for each AHMU class.

Class I AHMUs have the most specifically defined, restrictive direction, and Class II and Class III are less restrictive. The prescriptions are organized into three levels including: (1) temperature sensitivity constraints; (2) management prescriptions involving large woody debris, water quality, streambank and channel stability, fish passage, and special road construction; and (3) management opportunity prescriptions to increase primary and secondary productivity. The prescriptions for temperature sensitive streams are examined first to determine possible management options since these prescriptions are overriding in importance. Management prescriptions for temperature sensitive streams, if applied, preclude some of the other prescriptions listed for other aquatic habitat concerns. Prescriptions for fish passage through crossing structures are guided by an economic analysis (Forest Service 1986a), which compares the resource value to the additional expenses required to provide passage. Each unit layout card describes AHMU prescription application.

AHMU prescriptions differ from the National Marine Fisheries Service (NMFS) 30 meter buffer policy in that the AHMU prescriptions allow some management activities within the buffer area. Harvesting of individual trees within AHMU's (not to exceed 20 percent of the stand) is permitted only after a fishery biologist has determined that stream temperature, bank stability, and future sources of large organic debris will not be adversely affected. All buffers in Analysis Area 12 are 100 feet wide except for the buffers in one unit in VCU 417 and one unit in VCU 419. These units are adjacent to lake-like channels where large organic debris is not a concern and 50 foot buffers are sufficient to protect water quality and fish habitat. The use of these AHMU buffers is expected to result in little chance of a measurable change in fish habitat. The application of NFMS 30 meter policy in this project would result in lower timber volume, but not necessarily a higher level of protection for the fisheries resource since AHMU prescriptions are designed to provide resource protection based on site specific needs.

Any potential impacts on fish production as a result of the proposed alternative timber harvest plans are expected to be minimal. This conclusion is based on the following:

- The relative amount of habitat potential affected is small because only a maximum of 1.3 percent, depending on the alternative, of the available Class I and Class II habitat could potentially be affected by adjacent timber harvest and road construction activities.
- It is unlikely that all habitats would be impacted because of site specific management prescriptions described in the AHMU handbook (Forest Service 1986a).

Table 4-17

**Miles of Timber Harvest by Unit and by AHMU Class for Alternative 2<sup>1</sup>**

VCU	Unit Number	Buffer <sup>2</sup>	
		One Side	Both Sides
Class I			
399	12	0.4	0
400	7	0.1	0
	18	0	0.4
	24	0.4	0
402	2	0.6	0.4
	3	0	0.2
	10	0.2	0
	11	0	0.4
420	6	0.1	0
	10	0.6	0
	11	0.2	0
	12	0.6	0
	13	0.8	0
	14	0.3	0
421	15	0.3	0
	18	0.1	0
Total		4.7	1.4
Area Average Percent		2.7	0.8
Class II			
400	6	0.2	0
	15	0.3	0.2
	21	0	0.2
402	10	0.2	0.2
	14	0.2	0
421	13	0.1	0
Total		1.0	0.6
Area Average Percent		3.0	1.8

SOURCE: SEIS Planning Record.

NOTE: See the Alternative 2 map included with this document.

<sup>1</sup> Indicates only units with timber harvest adjacent to streams.

<sup>2</sup> Buffer means that trees are left standing along a stream according to AHMU prescriptions.



Table 4-18

## Miles of Timber Harvest by Unit and by AHMU Class for Alternative 3<sup>1</sup>

VCU	Unit Number	Buffer <sup>2</sup>	
		One Side	Both Sides
Class I			
399	12	0.4	0
400	7	0.1	0
402	2	0.6	0.4
	3	0	0.2
	10	0.2	0
	11	0	0.4
417	10	0.1	0
	12	0.1	0
418	1	0.6	0
	2	0.4	0.2
	5	0.2	0
	6	0.8	0
420	6	0.1	0
	10	0.6	0
	11	0.2	0
	12	0.6	0
	13	0.8	0
	14	0.3	0
421	6	1.1	0
	14	0	0
	15	0.3	0
	18	0.1	0
Total		7.6	1.2
Area Average Percent		4.0	0.9
Class II			
400	6	0.2	0
402	10	0.2	0.2
	14	0.2	0
417	14	0	0.3
	15	0	0.2
	20	0.2	0
421	13	0.1	0
Total		0.9	0.7
Area Average Percent		2.3	1.8

SOURCE: SEIS Planning Record.

NOTE: See the Alternative 3 map included with this document.

<sup>1</sup> Indicates only units with timber harvest adjacent to streams.

<sup>2</sup> Buffer means that trees are left standing along a stream according to AHMU prescriptions.

Table 4-19

**Miles of Timber Harvest by Unit and by AHMU Class for Alternative 4<sup>1</sup>**

VCU	Unit Number	Buffer <sup>2</sup>	
		One Side	Both Sides
Class I			
399	12	0.4	0
400	7	0.1	0
402	2	0.6	0.4
	3	0	0.2
	10	0.2	0
	11	0	0.4
420	6	0.1	0
	10	0.6	0
	11	0.2	0
	12	0.6	0
	13	0.8	0
	14	0.3	0
421	6	1.1	0
	15	0.3	0
	18	0.1	0
Total		5.4	1.0
Area	Average Percent	3.1	0.6
Class II			
400	6	0.2	0
402	10	0	0.2
	14	0.2	0
421	13	0.1	0
Total		0.9	0.2
Area	Average Percent	2.7	0.6

SOURCE: SEIS Planning Record.

NOTE: See the Alternative 4 map included with this document.

<sup>1</sup> Indicates only units with timber harvest adjacent to streams.

<sup>2</sup> Buffer means that trees are left standing along a stream according to AHMU prescriptions.

Table 4-20

## Miles of Timber Harvest by Unit and by AHMU Class for Alternative 5<sup>1</sup>

VCU	Unit Number	Buffer <sup>2</sup>		
		One Side	Both Sides	
Class I				
399	12	0.4	0	
400	7	0.1	0	
402	2	0.6	0.4	
	3	0	0.2	
	10	0.2	0	
	11	0	0.4	
419	12	0.3	0	
	13	0.5	0	
	14	0.1	0	
	15	0.5	0	
	16	0.2	0	
	18	0.2	0	
420	6	0.1	0	
	10	0.6	0	
	11	0.2	0	
	12	0.6	0	
	13	0.8	0	
	14	0.3	0	
421	6	1.1	0	
	15	0.3	0	
	18	0.1	0	
Total		7.2	1.0	
Area Average Percent		3.8	0.5	
Class II				
400	6	0.2	0	
402	9	0.2	0	
	10	0.2	0.2	
	14	0.2	0	
421	13	0.1	0	
Total		0.9	0.2	
Area Average Percent		2.1	0.5	

SOURCE: SEIS Planning Record.

NOTE: See the Alternative 5 map included with this document.

<sup>1</sup> Indicates only units with timber harvest adjacent to streams.

<sup>2</sup> Buffer means that trees are left standing along a stream according to AHMU prescriptions.



Table 4-21

**Miles of Road With AHMU Protection Measures by Stream Class**

Alternative	VCU	Miles in AHMU	
		<i>Class I</i>	<i>Class II</i> <sup>1</sup>
2	— <sup>2</sup>	0	0
3	405.1	0.2	0
	417	0.3	0
	418	0.3	0
	419	0.2	0
	Total	1.0	0
4	— <sup>2</sup>	0	0
5	419	0.3	0

SOURCE: SEIS Planning Record.

<sup>1</sup> No Class II streams are affected by any of the alternatives.

<sup>2</sup> No AHMUs are affected by this alternative.

Table 4-22

## Number of Stream Crossings that will Trigger Benefit/Cost Analysis<sup>1</sup>

VCU	Total Road Miles	Stream Crossings	
		<i>Class I</i>	<i>Class II</i>
<i>Alternative 2</i>			
400	9.5	0	2.0
420	1.9	1.0	0
421	<u>2.1</u>	<u>0</u>	<u>1.0</u>
Total	13.5	1.0	3.0
<i>Alternative 3</i>			
418	3.0	2.0	0
420	1.9	1.0	0
421	<u>5.5</u>	<u>1.0</u>	<u>1.0</u>
Total	10.4	4.0	1.0
<i>Alternative 4</i>			
420	1.9	1.0	0
421	<u>5.5</u>	<u>1.0</u>	<u>1.0</u>
Total	7.4	2.0	1.0
<i>Alternative 5</i>			
420	1.9	1.0	0
421	<u>5.5</u>	<u>1.0</u>	<u>1.0</u>
Total	7.4	2.0	1.0

SOURCE: SEIS Planning Record.

<sup>1</sup> Benefit/cost analysis is conducted to determine the most efficient design for crossing.

## Watersheds

Forest vegetation influences stream runoff through water uptake for growth (transpiration) and through evaporation of precipitation intercepted by the forest canopy. Clearcut blocks may alter runoff through changes in snow storage and snow melt timing. Stream runoff can also be affected through conversion of old-growth forest to a denser, more vigorous second-growth forest that may increase evapotranspiration losses and reduce streamflow during the summer growing season.

Streamflow concerns expressed in 1986-90 FEIS appeals regarding timber harvesting revolve around two perceived issues:

- initial peak flow increases following timber harvest that could accelerate channel erosion and destruction of fish habitat, and
- long-term reduction in summer low flow following establishment of second-growth timber stands that could result in loss of summer fish rearing habitat



A large body of scientific literature has been compiled on the effects of timber harvesting on water yield from forested watersheds. Bosch and Hewlett (1982) in a review of 94 catchment experiments found that an average of 25 percent to 30 percent harvest level was required to detect measurable effects in stream runoff. Water yield studies in the Pacific Northwest have shown an average of 25 percent increase in annual runoff when 25 percent to 100 percent of a watershed was clearcut harvested (Rothacher 1965, 1970, Rothacher et al. 1967, Harr 1976, 1983). In the same studies, however, the number of summer low-flow days significantly decreased the first few years after harvesting. No increases in destructive peak flows were observed except in a case where 15 percent of the watershed was severely compacted by skid trails and roads. In the Maybeso Creek watershed on Prince of Wales Island no detectable changes in streamflow were found after 25 percent of the watershed was clearcut (Meehan et al. 1960). Streamflow increases from the Fool Creek watersheds in Colorado have been monitored for over 30 years. Recent analysis of that data by Troendle and King (1985) indicates that the annual variation in streamflow is likely to be the result of long-term climatic trends instead of vegetation regrowth as was formerly thought.

In general, these research findings indicate changes in stream flow due to vegetative manipulation are difficult to quantify as is the duration of those changes. Also, stream flow changes are highly variable between watersheds based on differences in geography, landforms, soil types, vegetation, climate, and size of watershed and are difficult to detect without long-term (20-30 years) streamflow and climate data.

Much less information exists for timber harvesting effects on snow storage and snow melt processes, particularly in the rain dominated coastal runoff regimens found in Southeast Alaska. Recent studies have shown that clearcutting in transient snow zones can increase the magnitude of some high flow events in Pacific Northwest watersheds (Christner and Harr 1982, Harr 1981). Harr (1981) estimates that increased heat transfer to snowpacks in clearcut units may result in up to 25 percent increase in soil water input under certain climatic conditions. However, little data are available to evaluate the influence of clearcuts at middle and



upper watershed elevations on winter rain on snow peak runoff events (Chamberlin 1982). Rain on snow runoff events may occur infrequently in Southeast Alaska under conditions of wet, shallow snowpack coupled with heavy rain, high winds, and warm air masses. The probability for conditions existing within a given watershed to trigger a winter flood event will vary according to elevation, aspect, and local climate.

The Forest Service response to the second 1986-90 appeal issue is: "The preponderance of available scientific evidence, and monitoring of past management practices, indicates that old-growth conversion has not been demonstrated to produce a measurable decrease in summer low flows in Southeast Alaska. To date, it has not been observed that old-growth conversion to second growth produces any significant changes in summer low flows (Meehan et al. 1969, Rothacher 1970, Harr 1976)." [1986-90 FEIS Appeal Record]

There are no studies that quantify the exact level of harvest that will cause significant changes in flow regime and sediment production for watersheds in Southeast Alaska. However, it is known that a relationship does exist between the total amount of harvest within a watershed over a period of time and the probability of adverse effects on water quality, flow regimes, and sediment production.

A comparison of the alternatives (Table 4-23) shows little overall difference in the combined percentage of harvest proposed for each VCU. In all cases, the percentage of timber harvest proposed in the first entry (as defined by TLMP) would be less than 16 percent in each VCU. However, within Analysis Area 12 three individual watersheds approach a threshold of concern based on total percentage of harvest. These are the Saginaw Creek watershed in VCU 399, the un-named creek in the eastern Security Bay watershed in VCU 400, and the Browns Creek watershed in VCU 402 (McCorison, et al. 1988).

Table 4-23  
Percentage of VCU Harvested Through 1990<sup>1</sup>

VCU	Alternative				
	1	2	3	4	5
398	4.4	4.4	4.4	4.4	4.4
399	8.8	14.7	14.7	15.2	15.2
400	12.3	13.9	13.0	13.0	13.0
401	0	0	0	0	0
402	13.4	14.2	14.2	14.5	14.5
403	0.4	0.4	0.4	0.4	0.4
405.1	0.6	0.6	0.6	0.6	0.6
416	0.3	0.3	0.3	0.3	0.3
417	0	0	2.3	0	0
418	0.8	0.8	2.7	0.8	0.8
419	0.1	0.1	0.1	0.1	0.8
420	— <sup>2</sup>	2.3	2.3	2.3	2.3
421	12.4	13.9	14.9	14.9	14.9
427	0	0	0	0	0
428	0	0	0	0	0

SOURCE: SEIS Planning Record.

<sup>1</sup> These percentages are based only on watersheds within the VCUs that have streams with ADF&G numbers.

<sup>2</sup> Value is less than 0.1 percent.

The No Action Alternative, Alternative 1, would cease harvesting activities upon release of the Record of Decision for the SEIS. The differences in these three watersheds between the No Action Alternative, Alternative 1, and the Action Alternatives 2 through 5, are summarized in Table 4-24.

Potential effects of timber harvest on winter peak flows cannot be fully evaluated due to lack of data and knowledge about rain on snow runoff processes in Southeast Alaska. Because cutting units are dispersed throughout watersheds and that the relative percentage of clearcut units to total watershed area is small, the risk of increasing the frequency of destructive rain on snow runoff peaks is expected to be low.

Erosion of soil and subsequent sedimentation in streams are major concerns associated with timber harvesting activities and road construction and have resulted in stringent standards and guidelines. High concentrations of fine sediment in surface water and stream beds may adversely affect fish egg incubation in gravel beds and fry emergence from the gravel. Extremely high levels or chronic suspended sediment can also affect fish behavior and the abundance of aquatic insects, the primary fish food during the rearing phase of anadromous fish life cycles.

Timber harvesting activities may cause sedimentation in a number of ways, for example:

- stream channel and stream bank disturbances from yarding and felling trees adjacent to or across stream channels or from installation of bridges and culverts;
- road runoff from road construction and use; and
- mass soil movement (landslides) from road failure or slope failures in harvest units.

The Forest Service is developing Best Management Forest Practices designed to reduce water quality impacts associated with land management activities with the goal of meeting State water quality standards. In a Memorandum of Understanding between the Forest Service and Alaska Department of Environmental Conservation, the agencies have agreed to document management practices that effectively minimize the impacts from nonpoint sediment sources caused by timber management activities (Forest Service 1986b).

Selected watersheds in the Chatham Area have been monitored for a number of years to evaluate the effectiveness of these Best Management Practices in maintaining water quality. Sediment monitoring data were collected from the Indian River and Kadashan River water-

Table 4-24

### Percentage of Harvest in Watersheds Approaching Threshold of Concern

	Alternative				
	1	2	3	4	5
Saginaw Creek (ADF&G #109-44-10390)	25.3	26.3	26.3	27.3	27.3
Un-named creek in Security Bay (ADF&G #109-45-10090)	47.2	51.2	51.2	51.2	51.2
Brown's Creek (ADF&G #109-45-10080)	22.5	23.7	23.7	24.5	24.5

SOURCE: SEIS Planning Record.

sheds for a number of years prior to and following logging activity (Paustian 1988). Information on sediment transport from these studies is felt to be representative of stream conditions and harvesting techniques proposed in the 1986-90 Operating Plan.

Sediment discharge measurements taken on the mainstem of Indian River showed no significant change in sediment delivery following logging and road building that affected 8 percent of an 11 square mile watershed. In the Kadashan River study, sediment sources from road building were measured below road crossings on three first-and second-order tributary streams. Short-term impacts of road building resulted in increased suspended sediment yield equivalent to 2 percent of the estimated annual yields. Potential increases in total estimated sediment yield over a two-year period after road construction ranged from 20 percent to 66 percent in the three study streams. However, Paustian (1988) speculated that sediment inputs of this type and amount would not have been detectable in the mainstem of Kadashan River due to large in-channel sediment storage that tends to mask sediment delivery from short-term disturbances.

The conclusion reached from these studies is that logging disturbances were not great enough to cause changes in sediment yield above natural levels of sediment transport measured in the river prior to logging. This interpretation of the study results, however, only applies to low-level water quality impacts that occur within the first few years following logging. Data concerning the long-term impacts of logging on sediment in this area are not available. Swanston (1985) has instituted studies that will better address cumulative erosion and sediment delivery impacts associated with logging in Southeast Alaska.

Existing studies have not quantified exact levels of timber harvest that will cause changes in flow regime and sediment production, but general threshold levels of concern have been identified. Analysis of the alternatives indicates impacts to VCUs within Analysis Area 12 will be within watershed tolerance levels (although three individual watersheds are approaching a threshold of concern) for the following reasons:

- percentage of harvest will be below 16 percent in one decade in each VCU.
- appreciable changes in stream flows are not anticipated.
- potential sediment yields will be minimized to approach natural levels based on the application of standards and guidelines described on the Unit Cards (Appendix A-1).
- measurable changes in stream temperatures will be avoided through the use of AHMU Handbook buffer prescriptions.

The Unit Cards in Appendix A-1 document the application of AHMU Handbook buffer prescriptions. These buffers which are prescribed for all Class I and Class II streams, in addition to maintaining temperature stabilizing vegetative cover and a source of large woody debris, will provide undisturbed areas along streams that will act as a catch basin or filter to intercept potential sediment originating in disturbed areas in the harvest units.

The following units have Class I or II AHMUs and harvest proposed to within 50-feet of the stream: Unit 18 (VCU 400) under Alternative 2; Units 10 and 15 (VCU 417) and Unit 1 (VCU 418) under Alternative 3; and Unit 14 (VCU 419) under Alternative 5. Fifty foot buffers were selected in these units because the streams of concern have shallow gradients and stable banks. Fifty foot buffers in these kinds of situations will provide all the shading, bank stabilization and large woody debris source needed by these streams. All other Class I and II streams would have a 100-foot AHMU buffer left on both sides of the stream. If 100-foot buffers were implemented in those areas where 50-foot buffers are prescribed, 2.5 acres would not be harvested under Alternative 2, 7.0 acres under Alternative 3, and 1.0 acres under Alternative 5. Fifty and 100-foot buffers would result in the same harvest under Alternative 4.



AHMU prescriptions also apply to Class III streams. These streams do not hold fish, but are upstream from fish habitat and are important for maintaining water quality. AHMU prescriptions for Class III streams include full suspension or split line yarding and usually leaving 10 percent of the adjacent stand.

## Marine Environment

Currently, a log transfer facility has been proposed for development at No Name Bay in VCU 417. An environmental assessment (EA) that discusses alternatives considered in selecting a No Name Bay LTF was completed in April 1987 (Appendix B-1, Draft Phase II SEIS). This assessment analyzed eight locations for a log transfer facility in No Name Bay and two locations for an associated camp (Forest Service 1987).

Alternative 3 of this SEIS proposes construction of the No Name Bay LTF on a small island at the mouth of No Name Bay (Site 4 in the 1987 EA) and a logging camp above the south shore of No Name Bay (Site C in the 1987 EA). The LTF would be of the low-angled slide design. The environmental consequences of construction of the No Name Bay LTF at Site 4 and the logging camp at Site C, were analyzed in the 1987 environmental assessment. Those environmental consequences are summarized below.

### Conclusions for Marine Environment Effects

The magnitude of impacts is uncertain for Dungeness crab populations at Site 4 in No Name Bay. No known studies have documented a change in the catch of crab resulting from a log transfer facility. Direct impacts to crab fishing gear have been documented in Southeast Alaska when tug boats tow log rafts through fishing areas, tangling the floats and dragging the pots. As No Name Bay is only lightly fished for crab, the impact is expected to be minor, at most. The impacts on the Dungeness crab fishery from the proposed log transfer facility at

*Log Transfer Facility with a Low Angle Slide*



## 4 Environmental Consequences

Site 4 were estimated in the following way. ADF&G harvest data for Dungeness crab indicate Subdistrict 105-31 (which includes No Name Bay) produced an annual average of 39,000 pounds from 1969 to 1984. Additional data from Schultz and Berg (1976) indicate for 32 log transfer facilities studied, 18 had an average accumulation of 3.3 acres of bark (no bark accumulated at the others) (cited in Freese 1987).

Approximately 19,800 acres of shallow-water habitat is thought to support Dungeness crab in Subdistrict 105-31. If the assumed 3.3 acres of impacted habitat at Site 4 produces crab at the same rate as all the other shallow-water habitat in Subdistrict 105-31, then the expected annual crab catch would decline by 6.6 pounds, the weight of approximately two large adult male crabs. The value of the crabs would be approximately \$5.00 to a fisherman.

Site 4 was also selected because of the low potential for impacting marine fisheries. It is outside the sill and no high concentrations of marine species were observed by SCUBA divers. In other words, this habitat should be less productive than the average shallow-water habitat in Subdistrict 105-31.

The effect of a log transfer facility on salmon and herring is difficult to address as no known data are available on the relationship between a log transfer facility and these species. As both species inhabit the unimpacted water column, as opposed to the impacted substrate, any negative impact is expected to be small, if any.

### Land Status

Timber-sale planning has avoided areas that would require coordination or use agreements where conflicts could arise. Existing mineral claims do not conflict with any currently proposed alternatives. None of the action alternatives would significantly affect current land uses. Within Analysis Area 12, there are no harvest units planned near Native selected lands in VCU 398 and 399. Units located near the State of Alaska land in Security Bay, VCU 400, will be coordinated with the State as described in Chapter 3. Mining activities are minimal to nonexistent on Kuiu Island, and no conflicts with mining are anticipated.

The State land selection at No Name Bay was approved by the Regional Forester in August 1989. The Forest Service has requested an easement from the State of Alaska to build a road at No Name Bay. It would also be noted that No Name Bay is included in the Wilderness proposal in H.R. 987.

Timber harvesting and road building on private land would not be likely to occur under any of the existing alternatives. If any of the proposed land selections were implemented prior to initiation of timber harvesting activities, close coordination with land selections would be essential.

### Recreation

To determine the environmental consequences for the recreation resource in Analysis Area 12, it is necessary to examine expected future trends in recreation use and then determine how management activities might influence those trends. Although historical use figures fluctuate widely and depend somewhat on uncontrolled variables such as weather conditions and wildlife and fish populations, general trends are apparent. Under current conditions, use within the study area is expected to increase by less than 2 percent annually. Hunting, fishing, boating, and saltwater canoeing and kayaking will be the predominate recreational activities. Use by out-of-state residents (currently about one third of the total use) is expected to grow as interest continues to develop in the unique experience of Southeast Alaska. There is potential for increased outfitter/guide activities and for commercial floating lodges in future development in portions of Analysis Area 12. Facility development will correspond with anticipated growth and reflect user preferences for outdoor activities. Access will remain saltwater oriented.



These predicted trends are based on the following assumptions:

- a. Alaska's population growth has leveled off. Declines in some communities may occur as the economy changes.
- b. Tourism in the State has been increasing at 5 percent per year. Ferry travel to Petersburg has increased an average of 1 percent annually, and Kake is experiencing an increase of 3 percent annually.
- c. Recreation cabin use on the Stikine Area of the Tongass National Forest is increasing at an average rate of nearly 2 percent per year.
- d. State transportation plans do not call for ferry service to Kuiu Island.
- e. State surveys have shown that recreation activity preferences by residents continue to be boating, fishing, and hunting.
- f. The public has shown an increased interest in the Tebenkof Bay Wilderness. Publications are now available on canoe/kayak opportunities in this area.

Impacts on recreation were assessed by using two methods to analyze potential changes in existing recreation opportunities. One method looked at changes in the overall recreation setting by analyzing changes in the recreation opportunity spectrum (ROS) classes, while the other took a closer look at individual cutting units and their effects on known "recreation places" (defined in Chapter 3). In addition, the potential for future access was also considered in assessing impacts to recreation.

*Sport Fishing - Popular Recreation for Rowan Bay Residents*



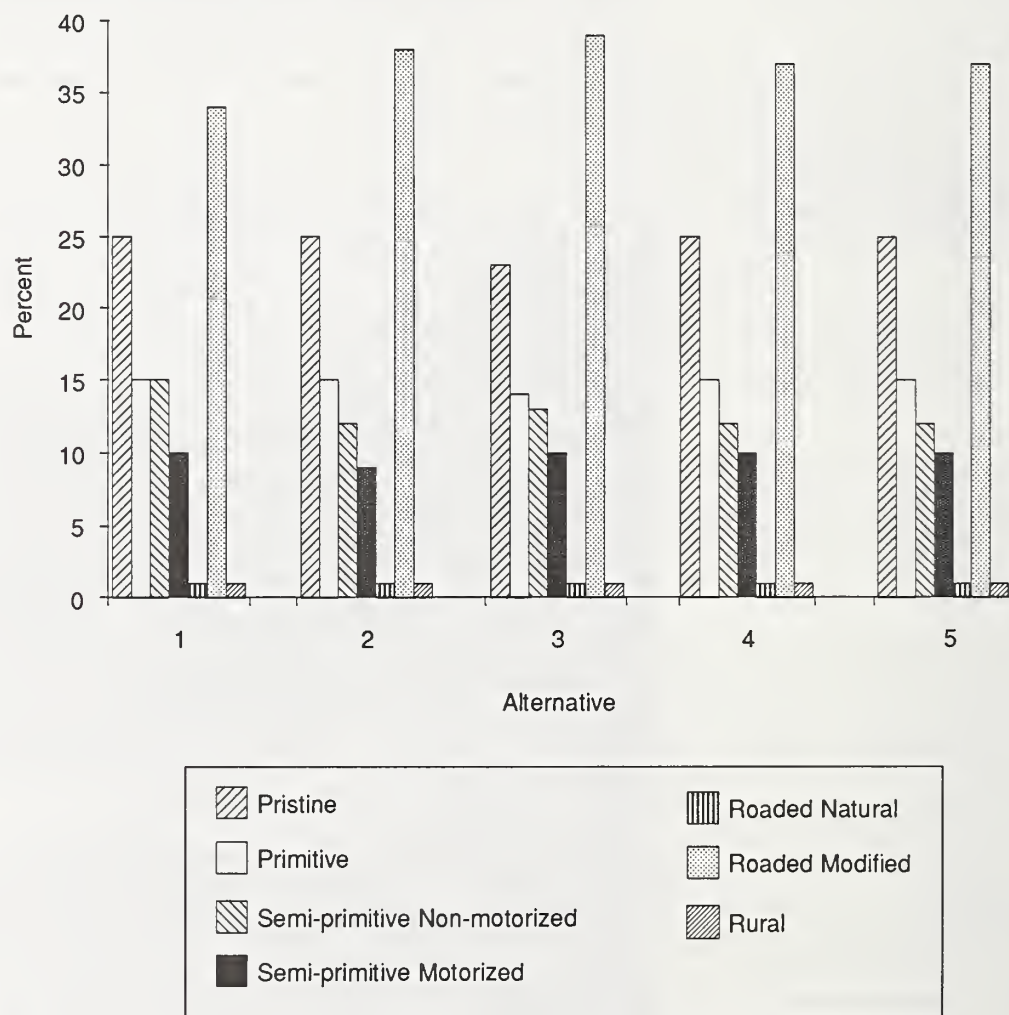


Figure 4-1 displays the percentage of land in each ROS class that would result under each alternative. Land ownership was not a consideration for this analysis. In general, all the action alternatives would result in a shift away from a primitive recreation setting. For residents of the Rowan Bay Camp, future access would become easier with the construction of more roads, and management activities would become more noticeable. These changes would be greatest under Alternative 3 and least under Alternatives 4 and 5.

The impact of harvest operations on known “recreation places” is more important. Road construction west of Security Bay (VCU 400), as proposed in Alternative 2, would directly affect not only hunters using the estuary, but also boaters in the adjacent State Marine Park. Operations proposed in Alternative 3 would impact users of the Alecks Creek Portage Trail leading to Tebenkof Bay Wilderness. A road would bisect this travel route. Alternative 4 would result in the least impact on “recreation places.”

Figure 4-1

## Recreation Opportunity Spectrum (ROS) Classes Resulting from the Alternatives



SOURCE: GIS database, Stikine Area Supervisor's Office, Petersburg, AK.

Due to the lack of ferry service to Kuiu Island, none of the alternatives are expected to significantly influence anticipated recreation growth within the study area. Although road construction is planned, public means of access from surrounding communities would remain nonexistent. These changes would permit visitors to access, by foot, much of the analysis area, however, no significant increase in vehicle traffic is expected.

## **Alternative 1**

The No Action Alternative would maintain the existing recreational character of Kuiu Island, as described in Chapter 3 (Affected Environment), through the planning period.

## **Alternative 2**

Two major areas previously unroaded would be opened to vehicle access under Alternative 2. One lies directly west of Security Bay (VCU 400), the other, west of Port Camden (portion of VCU 420). The latter contains no highly valued user sites and receives little recreation use. Although little or no effect on recreation is expected here, boaters in the adjacent waterway may notice distant harvest units.

In contrast, logging to the west of Security Bay (VCU 400) may impact several recreation user groups. Construction of new roads would result in a shift away from the semi-primitive setting to a roaded setting, and would allow those residing on the island easier access to the estuary at the head of the bay, highly valued for its excellent waterfowl hunting. In the future, if the resident population increases at Rowan Bay or at other areas on the island, an increase in hunters could impact that experience. Although most of the surrounding harvest units along the bay have been designed to blend with the surrounding landscape, several would still be readily visible to boaters in Security Bay and the adjacent State Marine Park. This alternative represents the largest change in recreation opportunities within a recognized dispersed use site.

Other clearcut units are planned directly south of Saginaw Bay (Units 7, 8, 9, and 12), but would not affect any known "recreation places." The surrounding topography would screen all harvest activities from the bay.

No timber harvest or road construction proposed under this alternative would occur near any developed recreation facilities. In addition, East Kuiu (VCU 416-418 and 405.1) would retain its primitive character.

## **Alternative 3**

Alternative 3 differs from Alternative 2 in that: 1) semi-primitive opportunities would be retained since no logging is proposed west of Security Bay, 2) a shift from primitive/pristine opportunities to roaded would occur on East Kuiu with the development of log transfer facilities and associated timber cutting in No Name Bay and VCU 418, and, 3) new roaded opportunities would occur east of Kadake Creek.

No timber harvest or road construction west of Security Bay is proposed under this alternative. The recreation character of these identified dispersed sites would be retained.

No Name Bay serves as an entrance corridor to the Tebenkof Bay Wilderness via the Alecks Creek Canoe/Kayak Portage Trail. New road construction would bisect this travel route; however, trail signing would continue to direct users into the adjacent wilderness.

Alternative 3 would require road construction through VCU 405.1, however, clearcuts are not planned in this area. The road would permit easier access to the wilderness for residents of Kuiu Island, although it would not be expected to significantly increase wilderness use. Future opportunities may exist for incorporating part of this road surface as a designated portage route making the transport of a canoe or kayak less difficult.

The development of a log transfer facility at No Name Bay would directly affect an existing anchorage there. During times of log storage and operation, space would be limited. To mitigate this potential loss, the facilities design plans would incorporate a public-use float.

A change in recreational experiences along Kadake Creek would also be expected with new logging operations in that vicinity. Impacts to anglers along the creek would be greatest during periods of active timber harvest and road construction. Clearcut units would be visible along sections of the stream channel. This is especially true in the eastern part of Unit 6 and northern part of Unit 7. Impacts to boaters or recreation cabin users in Kadake Bay, however, would not be expected.

New roaded opportunities would also occur west of Seclusion Harbor. Impacts to this area are not expected to be significant, however, due to the screening effects of local topography. Planned cutting south of Saginaw Bay would increase roaded opportunities, yet be screened from recreation sites by topography. Likewise, road construction and logging west of Port Camden would not significantly impact Island visitors. Boaters in Port Camden may notice distant harvest units.

### Alternative 4

Alternative 4, expected to have the least impact on recreation, proposes scattered harvest units along existing roads in the interior of Kuiu Island, and new road construction and harvest in Kadake Creek. Impacts to anglers along Kadake Creek would parallel those described above for Alternative 3. Harvest units proposed south of Saginaw Bay (Units 9 and 11) may be visible to recreational boaters. East Kuiu would continue to provide primitive/pristine recreation opportunities.

### Alternative 5

In general, impacts resulting from harvest and road construction proposed for Alternative 5 would be the same as those described for Alternative 4. Recreation opportunities would shift from semi-primitive to roaded. In addition, this alternative proposes to extend the road system north around Threemile Arm close to a prominent estuary used for hunting. Clearcuts (Units 21 and 22) would also be visible to boaters near the mouth of Threemile Arm. Nevertheless, impacts to recreationists using the estuary would be minimal because harvest units in that area would be nearly a quarter of a mile inland, small in size, and in fairly flat terrain.

## Visual Resources

The management activities proposed in the action alternatives may be visible to people from watercraft, aircraft, ground vehicles, or on foot. Impacts of the alternatives to visual resources were evaluated by comparing the changes in Visual Condition acreage that would result by implementing each alternative. Expected changes in visual condition under the alternatives are shown in Table 4-25. In addition, those VCUs that are visually affected by the alternatives were evaluated for consistency with the assigned Visual Quality Objectives (VQOs) presented in Chapter 3, Table 3-29.

The Land Use Designation (LUD) classes assigned in the TLMP were also considered in developing the alternatives and evaluating their visual effects (see Chapter 1 for definitions of the various LUD classes). In general, LUDs I and II are wilderness and roadless areas where further timber harvest activities are not planned. LUD III areas give equal emphasis to commodity values and amenity values such as visual quality, recreation, and wildlife, while the emphasis in LUD IV areas is on commodity values (primarily timber production). The visual effects of activities in LUD IV areas are considered, but where a conflict between timber harvest activities and visual effects occurs, commodity production takes precedence. Under all of the action alternatives, the greatest effects on visual resources would occur on commercial forest land managed as LUD IV. Therefore, although certain areas would be visually affected by the alternatives, the visual impacts would be considered less important since these VCUs have been primarily designated for timber production in the TLMP.



Table 4-25

### Changes in Visual Condition in Acres

Visual Condition Classes (Type)	Alternative <sup>1</sup>				
	1	2	3	4	5
I	221,556	215,235	216,872	218,099	217,325
II	1,506	1,506	1,506	1,506	1,506
III	2,705	3,425	2,784	2,705	2,705
IV	7,070	8,304	7,073	6,910	7,004
V	64,817	69,184	69,419	68,434	69,114

SOURCE: GIS database, Stikine Area Supervisor's Office, Petersburg, AK.

<sup>1</sup> Alternative 1 is the No Action Alternative and its acreages represent the current EVC classes.

#### Alternative 1

The visual character of the area would be maintained in its current visual condition under Alternative 1, the No Action Alternative.

#### Alternative 2

Five VCUs would be entered by Alternative 2. Proposed activities in three VCUs (399, 402, and 420) would meet the assigned VQOs specified in Chapter 3, while proposed activities in the other two (400, 421) would not. VCUs 400 and 421 are designated as LUD IV.

In the Security Bay area (VCU 400) two harvest units (400-15 and 400-19) would not meet the assigned VQO of Modification. The backline of Unit 400-19 would be highly evident when viewed from Security Bay as well as the privately owned residence located on the east side of Security Bay. Unit 400-15 would be apparent from the Bay as the traveler moves south. The remaining activities on the west side of Security Bay would meet the assigned VQO of Modification. All of the action alternatives propose four harvest units in VCU 400 east of Security Bay (400-2, 400-4, 400-5, 400-6). These units would meet the assigned Modification and Maximum Modification VQOs.

#### Alternative 3

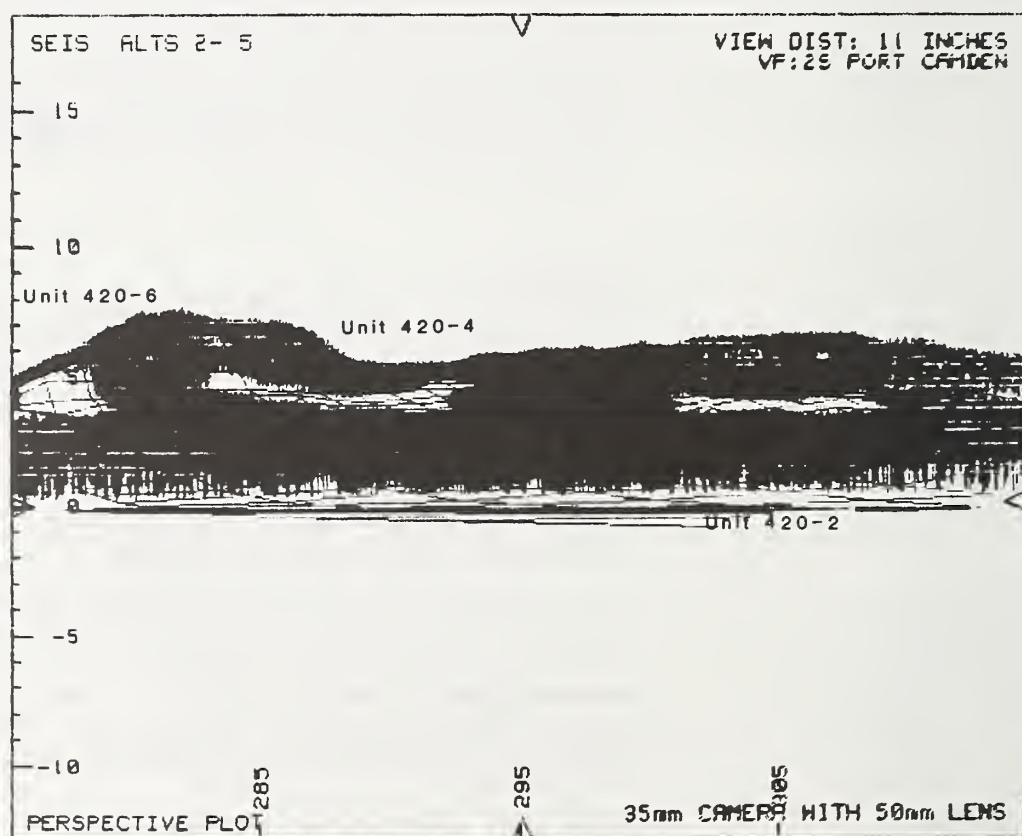
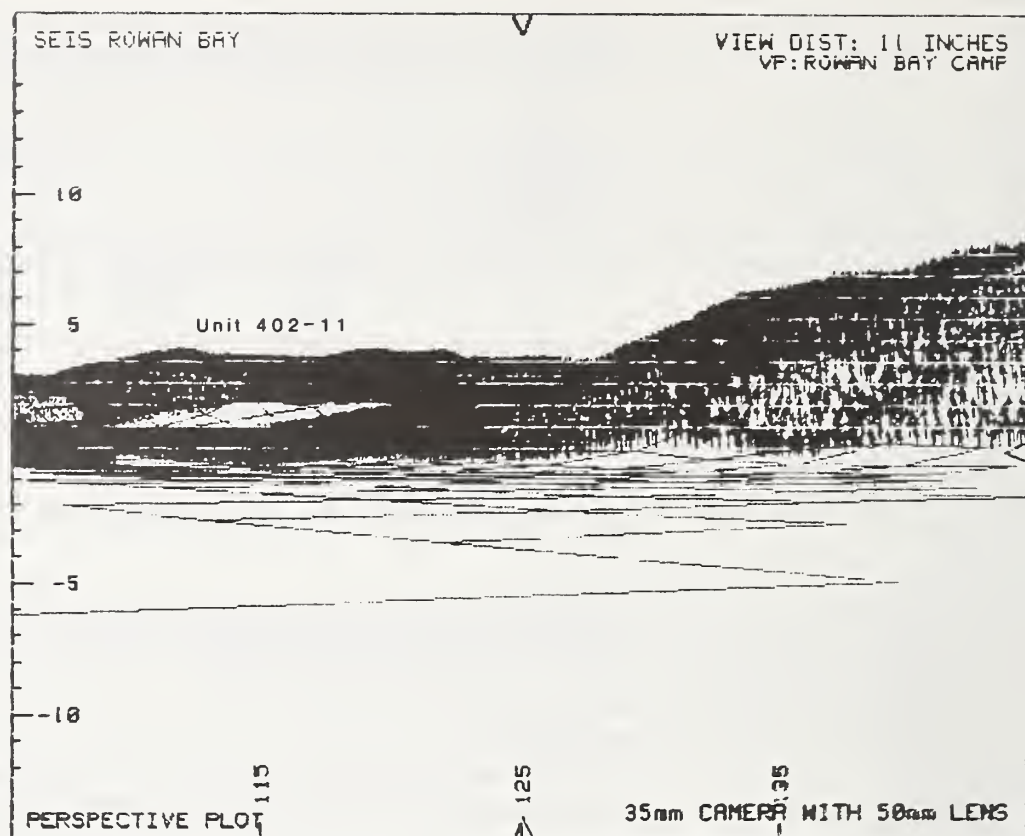
Five of the eight VCUs proposed for activity under Alternative 3 would meet the assigned VQOs. These are VCUs 399, 400, 402, 405.1, and 420. Activities proposed in VCUs 417, 418, and 421, all designated as LUD IV, would not meet the assigned VQOs.

In No Name Bay (VCU 417) two proposed harvest units (417-13 and 417-14) would not meet the Modification VQO, as harvesting would extend to the ridge line creating unnatural form and line in the landscape that would dominate the visual setting. In the Salt Lagoon area (VCU 418) Unit 418-2 would not meet the Partial Retention VQO, but would be more appropriately characterized as Maximum Modification.

Activities proposed in the Kadake Creek area (VCU 421) would be noticeable from the Creek, where weekly use occurs by both sport and subsistence fishing enthusiasts. Units 421-6 and 421-7 would dominate the view from the Creek's edge resulting in a characterization of Modification where the assigned VQO is Partial Retention. The location of Unit 421-11 on the ridge south of Kadake Bay would be evident from Kadake Creek and would result in Maximum Modification where the assigned VQO is Modification.

# 4 Environmental Consequences

*Computer Generated Perspectives are Used by Planners to Evaluate Potential Impacts*



**Alternative 4**

Four of the five VCUs proposed for activity under Alternative 4 would meet the assigned VQOs. These are VCUs 399, 400, 402, and 420. In VCU 421, LUD IV, assigned VQOs would not be met. The activities proposed in the Kadake Bay area (VCU 421) would have similar visual effects as described above for Alternative 3.

**Alternative 5**

Of the six VCUs proposed for activity under Alternative 5, VCUs 399, 400, 402, and 420 would meet the assigned VQOs. While VCUs 419 and 421 would not, they are both designated LUD IV. Activities proposed in the Threemile Arm area (VCU 419) would be evident to marine travelers. Because of their size, Units 419-21 and 419-22 would not meet the assigned VQO of Modification, but would approach the Maximum Modification VQO criteria. Activities proposed in the Kadake Bay area (VCU 421) would have similar visual effects as described above for Alternative 3.

**Cultural Resources**

Cultural resource sites within the study area may contain significant information on past environmental conditions and lifeways, possibly including information related to environments and cultures along the northern Pacific Rim or the interior of the North American continent. These sites are both fragile and nonrenewable. Impacts can include alterations to the setting of sites; alterations of aboveground objects, features, and structures, as well as the spatial relationships among them; and disturbance or destruction of subsurface cultural deposits.

Federal laws and regulations (particularly the National Historic Preservation Act of 1966, as amended; Executive Order 11593; and the American Indian Religious Freedom Act of 1978) require a process, outlined in 36 CFR Part 800, for considering the impacts of Federal projects on cultural resources. In brief, this process involves inventorying the resources, determining which are significant or eligible for inclusion in the National Register of Historic Places, evaluating project impacts, and designing and implementing measures to mitigate the adverse effects that projects may have upon significant resources. The process is undertaken in consultation with the State Historic Preservation Officer (SHPO).

In consultation with the SHPO, the Forest Service has developed a research design that will be applied to the selected alternative. This research design provides a method for evaluating topographic features within the VCUs according to their sensitivity or probability for containing cultural resources. The research design also specifies the percentages of each probability category to be inventoried as well as the methods to be used for cultural resource surveys.

The alternatives under consideration are generally not expected to differ in their impacts on cultural resources. Before logging activities are undertaken in the selected alternative, Forest Service personnel will apply the research design to inventory cultural resources, evaluate their significance, determine potential project impacts, and design and implement necessary specific mitigation measures. Such measures could include relocating or redesigning some timber management activities to avoid disturbing cultural resources, protecting sites through the use of barriers, and recovering scientific data or otherwise documenting sites that cannot be avoided or protected. Mitigation measures would be designed to eliminate adverse project effects on significant cultural resources. The APC contract provides for enforcement of mitigating measures to avoid or minimize impacts on cultural resources.

Under the No Action Alternative no new activities will be proposed through December 1990. This alternative will result in no further effects on cultural resources. Cultural resource specialists would need to examine six harvest units, or 247 acres, and approximately 10 miles of road prior to development under Alternative 2. Cultural resource specialists would need to examine three harvest units, or 130 acres, and approximately 3 miles of specified road prior to development under Alternatives 3 and 4. Alternative 5 would require examination of four harvest units, or approximately 150 acres, and approximately 4 miles of specified road prior to development.



## Socioeconomic Impacts

The primary socioeconomic impact of a long-term timber harvest would be a shift in log grades resulting from a transition of mature and overmature stands to second growth, affecting the lumber and wood products industry in Southeast Alaska. This impact would fall most heavily on cant producers in the industry, who require select and No. 1 grade spruce and hemlock logs. Some volume of No. 1 grade logs would exist, however, to support some cant manufacture. Due to the primary processing requirements attached to the purchase of National Forest timber, the wood products industry is expected to continue in Southeast Alaska. As long as logs continue to command higher profits per unit than sawn products in Pacific Rim markets, no incentive would likely exist for native land owners or the State to provide logs to the mills.

The potential of expanding the production of dimension lumber and alternative products could result in a positive impact on the lumber and wood products industry. Recent analyses of alternative product mixes for the Southeast Alaska lumber and wood products industry (ANILCA 706(b) Status Report, Forest Service 1985) indicate that a modest restructuring of the industry could accommodate the harvest of second-growth timber. The product mix associated with this new structure is predicated on current market prices. The restructuring of the industry, although possible with existing prices, would also require investment by the public and/or private sector(s) in new processing facilities.

Pulp production would retain a pivotal relationship in the market for logs and chips in the restructured industry. Cant production, as previously discussed, would be reduced to one-quarter of all volume processed, regardless of source. Lumber production would increase to a level equal to the present cant production. Chip production would remain the same, and the remaining volume (about 10 percent) could result in a plywood substitute.

New markets, lower relative production costs compared to other Pacific Rim countries, investment in existing industry to increase productivity, or an increase in prices for Alaska lumber and wood products would aid in the use of second-growth timber. With the stabilizing of these Alaska wood product exports, some of these conditions, as well as a restructuring of the industry, could take place.

### Contribution of Timber from State and Private Lands

Overall demand for Southeast Alaska timber has remained relatively constant over the last 6 years. Demand for National Forest timber, however, has declined since 1980, as timber supplied from private landowners and Native Corporations almost tripled. During the first half of the 1980s, in response to market demand for logs, harvest on private and Native Corporation and other private lands has been directed at the more accessible and better quality timber. Timber from private and Native Corporation and other private lands can be exported as unprocessed logs and are not subject to the "primary manufacture" requirement of National Forest timber. Further, higher quality, unprocessed logs have been in greater demand than the processed wood products from National Forest timber. Timber harvests from private lands throughout Southeast Alaska are expected to range up to 350 million board feet per year until the mid to late 1990s if current market conditions continue. Once these finite high-quality stands of old growth are harvested, the remaining less valuable, low volume stands would be more expensive to harvest and more difficult to market. If demand continues at current levels, the demand for National Forest timber would increase when harvests on other ownerships decline and cost differentials narrow.

The major landholders, other than the Federal Government within or near the APC Contract area, are Native Corporations. They are Sealaska, a Regional Corporation and Huna Totem, a Village Corporation. There is also a possibility that Congress will allow Shee Atika Corporation the option of land ownership on Kuiu Island.



## Employment Impacts

A major reason for selling timber from the Tongass National Forest is to provide for economic development and community stability. The objectives of timber harvest are the result of specific guidelines furnished through legislation and historic direction related to employment, price stability, economic efficiency, foreign relations, small business, economic growth and development, community stability, and national security (Darr undated).

Since 1980 the Alaska National Interest Conservation Act (ANILCA) and the TLMP have furnished the direction for timber harvest. Section 705 of ANILCA authorizes funding to maintain a harvest level of 4.5 billion board feet per decade. Section 101(d) of ANILCA states the intent of Congress:

“This Act provides sufficient protection for the national interest in scenic, natural, cultural, and environmental values on the public lands in Alaska, and at the same time provides adequate opportunity for satisfaction of the economic and social needs of the State of Alaska and its people; accordingly, the designation and disposition of the public lands in Alaska pursuant to this Act are found to represent a proper balance between the preservation of national conservation system units and those public lands necessary and appropriate for more intensive use and disposition, and thus Congress believes that the need for future legislation designating new conservation system units, new national conservation areas, or new national recreation areas, has been obviated thereby.”

This section addresses the employment benefits that are derived from the harvest of timber on the Tongass National Forest and those that would be derived from the alternatives considered for Analysis Area 12 in this SEIS.

Based on a timber supply and demand report for Southeast Alaska (Forest Service 1989b) and estimates derived from the IPASS model (Olson, et al. 1984), Forest Service staff have calculated the average direct and indirect employment related to harvest volume from the Tongass National Forest. These figures include 8.5 jobs/MMBF/year direct and indirect employment. Each job was calculated to be worth an average of \$23,200. Table 4-26 shows the effects of each alternative in jobs and wages. Alternative 1 would harvest no timber and, therefore, would produce no employment or income. Alternative 3 would generate the most jobs (1061) and salaries (over \$24.6 million) based on the largest harvest volume. Alternatives 5, 4, and 2 each generate fewer jobs and less salary value than Alternative 3 based on their lower harvest volumes.

Since relatively little recreational activity takes place in Analysis Area 12, and since the alternatives would have very little effect on the recreation places, no measureable impact is expected on employment and income opportunities in the recreation and tourism industry. The only significant commercial recreation activity in Analysis Area 12 is guided black bear hunting. Since none of the alternatives are expected to impact black bear populations, no impact on guided bear hunts is anticipated.

Table 4-26

### Jobs and Wages Maintained for Each Alternative

	1	2	3	4	5
Volume of Harvest (MMBF)	0	87.4	124.8	93.8	105.3
Jobs Maintained	0	743	1061	797	895
Value from Wages (Million \$)	0	17.2	24.6	18.5	20.8

SOURCE: Timber Supply and Demand, Draft 1988 Report (Forest Service 1989b).



As was mentioned earlier in this chapter, potential impacts on fishery resources are minimal because of the site specific AHMU prescriptions being applied along fish streams and the relatively small amount of fish habitat adjacent to harvest units. Because of this, none of the alternatives are expected to have any affect on income or employment opportunities in the sport or commercial fishing industries or any related economic sectors.

## Economic Impacts



APC Pulp Plant Loading Dock

This section addresses the major components of costs to the industry of harvesting the timber. This evaluation of costs and benefits provides one basis for comparing the alternatives.

The costs of harvesting timber and converting it into marketable forest products are comprised primarily of harvest costs, transportation costs, and manufacturing costs. Those components, discussed below, can vary from one alternative to another.

Timber harvest cost estimates are based on the Region 10 Timber Appraisal Handbook (FSH 2409.22). Base Year 1986 appraisal costs adjusted to the quarter ending June 1988 were used to analyze the SEIS alternatives, using a trial appraisal process. These estimates represent costs that an "operator of average efficiency" would be expected to incur. Several factors affect appraisal costs, including species mixture, log grade, net volume/acre, logs/MBF, yarding distance, woods and scaling defect, and percent sideslope. Of these factors, species mixture, log grades, and logs/MBF have the greatest effect on harvesting costs.

The appraisal (harvest) costs for each of the action alternatives are displayed in Table 4-27. Alternative 1, the No Action Alternative, was not appraised as all volume is expected to be harvested prior to implementation of the ROD. Alternative 3 would have the highest total harvesting costs. Alternative 2 would have the lowest total cost followed by Alternatives 4 and 5.

The manufacturing costs (Table 4-27) depend primarily on the total board feet, the species mixture, and the log grade and size. For this analysis, the assumption was used that the species mixture and log grade and size would be the same for all alternatives, since that information only becomes available later in the harvest process.

The three major variables affecting road construction costs are terrain, road standard, and the number of bridges required. Experience has shown that roads constructed in similar terrain will have costs that are similar. Higher road standards may affect road costs by requiring wider roads with flatter grades designed to reduce haul costs. Bridges are relatively expensive and contribute heavily to road construction costs. Alternative 2 has the lowest road construc-

Table 4-27  
Timber Harvest and Manufacturing Costs in Millions of Dollars<sup>1</sup>

	Alternative			
	2	3	4	5
Felling and Bucking	1.9	2.8	2.1	2.4
Skid, Load and Depreciation	7.3	10.4	7.8	8.8
General Logging Overhead	0.3	0.4	0.3	0.3
Temporary Roads	1.3	1.5	1.5	1.6
Other Temporary Developments	0.2	0.3	0.2	0.2
Total Harvest Cost	11.0	15.4	11.9	13.3
Manufacturing Cost	22.2	31.6	23.8	26.7

SOURCE: Timber Appraisal Handbook, FSH 2409.22 (Forest Service 1986a).

<sup>1</sup> Costs to an Operator of Average Efficiency.



*Post Office at Rowan Bay*

tion cost per mile primarily because a large proportion of the roads are proposed along the toe of slopes on terrain with sideslopes less than 20 percent and are low standard design. Alternative 3 has the highest unit cost per mile because a large proportion of these road miles are high standard and have numerous bridges.

Road maintenance is the upkeep of the entire transportation facility during loghauling and related timber harvest activities. Road maintenance costs are derived from the amount of timber being hauled and the distance being hauled. Alternative 5 has the highest cost per MBF primarily because of the large amount of timber being hauled greater distances to Rowan Bay LTF. Conversely, Alternative 3 has the lowest cost per MBF because of the short haul distances to the proposed LTF in No Name Bay.

Log haul costs are a product of the amount of timber hauled, distance hauled, and the condition of the route, or road standard. The higher the road standard, the higher the speed and the lower the haul costs. Alternative 3 has the lowest land (truck) haul unit costs per MBF because with the proposed log transfer facility in No Name Bay there are shorter road distances with higher road standards. Alternative 5 has the highest costs because the proposed volume in north Three Mile Arm has long haul distances to the log transfer facility at Rowan Bay.

Water tow costs are a product of the amount of timber towed and the distance it is towed, along the fixed costs of dumping, rafting, and raft storage. Alternative 3 has a slightly higher cost per MBF because of the longer tow distance for the pulp logs from No Name Bay to Sitka.

The transportation costs for each alternative are presented in Table 4-28. Alternatives 4 and 2 result in the least total transportation costs because they would construct the least amount of road for the amount of timber being made available. Alternative 3 would result in the highest total transportation cost with Alternative 5 being intermediate.

The unit costs (dollars per MBF) for the action alternatives are provided in Table 4-29. When harvest, transportation, and manufacturing costs are considered together, Alternative 4 has the lowest total cost per MBF. Alternatives 2 and 5 have similar, intermediate costs, and Alternative 3 has the highest total costs.

Table 4-28  
**Transportation Costs**

Item	Alternative			
	2	3	4	5
Miles of Road Construction <sup>1</sup>	27.2	37.3	23.4	29.6
Thousand Board Feet <sup>1</sup>	87,420	124,788	93,764	105,269
Road Construction Cost/Mile <sup>1</sup>	\$130,000	\$149,000	\$135,000	\$135,000
<i>Costs</i>				
Road Construction	\$3,536,000	\$5,558,000	\$3,159,000	\$3,996,000
Road Maintenance	\$308,000	\$357,000	\$322,000	\$405,000
Log Truck Haul	\$1,406,000	\$1,619,000	\$1,479,000	\$1,830,000
Water Tow	\$2,583,000	\$3,842,000	\$2,790,000	\$3,135,000
Log Transfer Facility	\$0	\$310,000	\$0	\$0
Total	\$7,833,000	\$11,686,000	\$7,750,000	\$9,366,000

SOURCE: Engineers Guide for Estimating Costs of Survey, Design, and Construction of Roads and Bridges. USDA Forest Service, Region 10, Juneau, AK. December 1, 1988.

<sup>1</sup> These values were used to calculate the transportation costs shown.

Table 4-29  
**Unit Costs (\$ per MBF) for Harvest, Transportation, and Manufacturing**

	Alternative			
	2	3	4	5
Harvest Volume (MMBF) <sup>1</sup>	87.4	124.8	93.8	105.3
<i>Costs</i>				
Unit Harvest	126.77	124.44	127.16	127.02
Unit Transportation	90.67	94.50	83.74	89.91
Unit Manufacturing Costs	252.80	252.80	252.80	252.80
Total	470.24	471.74	463.70	469.73

SOURCE: Timber Appraisal Handbook, FSH2409.22 (Forest Service 1986e).

Engineers Guide for Estimating Costs of Survey, Design, and Construction of Roads and Bridges. USDA Forest Service, Region 10, Juneau, AK. December 1988.

<sup>1</sup> These values were used to calculate the unit costs shown.

## Reasonably Foreseeable, Long-Term, and Cumulative Effects

This section of Chapter 4 addresses the reasonably foreseeable, long-term, and cumulative effects of the alternatives on the environment of Analysis Area 12. The reasonably foreseeable time frame is here interpreted to mean until the end of the APC Long-Term Contract (the year 2011). The long-term time frame is addressed as extending to the end of the first complete harvest rotation (the year 2080). Cumulative effects include the effects of past harvest, existing harvest, adjacent harvest, and harvest proposed under the SEIS alternatives projected into the reasonably foreseeable future.

Future harvest projections were developed using the Multi-Entry Layout Process (MELP) analysis according to the Alaska Regional Guide pages 3-21 and 3-22 (Forest Service 1983). The MELP documentation used for the 1986-90 FEIS has been updated as a primary data source for this document and is part of the planning record. MELP identifies the commercial forest land, logging systems, and road networks required to manage the timber resources of each VCU in Land Use Designation (LUD) III and LUD IV categories. It also considers high hazard soil conditions, fisheries and wildlife habitat management objectives, and management objectives relating to visual and other resources. In addition, timber harvest markets and potentially uneconomical timber stands were considered.

The long-term and cumulative effects analysis tiers to the Tongass Land Management Plan (TLMP) (Forest Service 1979a), the TLMP amendment (Forest Service 1986b), and to the FEIS for the 1986-90 Operating Period of the Alaska Pulp Corporation Long-Term Sale Area. It also incorporates information from a Life of Sale Plan for the APC contract prepared in 1982 and updated in 1986 (Forest Service 1982). The decisions made in TLMP provide long range direction for management of the Tongass National Forest for the duration of that plan. It is important to remember that forest plans are reviewed periodically and revised at least every 10 to 15 years. The TLMP is presently being revised. Decisions made during the revision process can provide for significant changes in management emphasis in any given portion of the National Forest.

The Life of Sale Plan uses the timber output scheduled in TLMP to project the volume range to be harvested in each Operating Period through the end of the APC Contract, the year 2011. MELP does not schedule specific activities within the life of the APC Contract, but projects the TLMP direction through the life of the APC Contract to establish an end baseline for estimating reasonably foreseeable effects. The alternatives considered in this SEIS present various site-specific means of achieving part of the schedule developed in the Life of Sale Plan (Forest Service 1982). The reasonably foreseeable, long-term, and cumulative effects do not depend entirely on the alternatives presented in this SEIS. Rather, they include what may be expected under the current direction planned in TLMP, the Life of Sale Plan, and projected by MELP. The reasonably foreseeable, long-term, and cumulative effects would occur under any of the action alternatives until such time as TLMP is revised.

In the Memorandum and Order from *Tenakee Springs v. Courtright*, the Court indicated that “the EIS should consider, to the extent of foreseeability, the cumulative impacts on the natural environment of a steadily expanding network of logging roads and cutting units.” For the purposes of this document, reasonably foreseeable effects are defined as those effects that can be predicted to occur assuming all APC contractual commitments are met by the year 2011.



## Assumptions

The following assumptions were used to assess the reasonably foreseeable effects to the end of the APC Contract. These assumptions reflect current management/technology of National Forests and provide a uniform approach to estimating effects of timber harvest and road construction. Following the assumptions, the reasonably foreseeable, long-term, and cumulative effects on each resource category are discussed. The discussions may supplement and/or summarize the material presented in 1986-90 FEIS (Forest Service 1986b).

- The geographical items in the MELP data base are:
  - 1) the locations of National Forest System land projected for potential harvest in the future (operable CFL),
  - 2) the locations of National Forest System land projected for potential harvest over an extended rotation,
  - 3) the locations of National Forest System land projected to remain for wildlife,
  - 4) the locations of National Forest System land that is expected to be economically inefficient to harvest under a timber harvest scheduling scenario that would approximate TLMP guidelines. Decisions have not been made addressing that exact site-specific placement of resource objectives.
- There will be three entries into the commercial forest land without an extended rotation
- Four entries into LUD IV extended rotation areas are planned over a 120-year period.
- All main corridor roads would be built during the life of the APC contract. Forest roads accessing commercial forest land to be harvested would be built on first entry.
- Laws, Guidelines, and Best Management Practices for resource protection would be followed. These requirements are expected to be at least as stringent in the future as they are today.
- Timber sale planning would occur in an interdisciplinary fashion.
- Second-growth stands within deer winter range would be managed to provide cover and forage.
- All harvest units would be clearcut.
- All acres of operable commercial forest land are equally subject to impacts.
- The No Action Alternative would represent only a delay in implementing TLMP and, therefore, would have no foreseeable, long-term effects.

## Vegetation/Timber

The following discussion of reasonably foreseeable, long-term, and cumulative impacts on forest vegetation draws from and supplements pages 4-230 to 4-234 in the 1986-90 FEIS. No further analysis has been conducted since the 1986-90 FEIS on long-term and cumulative effects of harvest on second-growth timber or the forest products market for second-growth timber. Below are discussions of the vegetative changes expected to occur through time on harvested acres, the timber harvest projected through 2011, as well as the operable CFL that would remain, effects on mature and overmature timber stands, and effects of timber harvest from private lands. The discussion of the vegetative changes through time is especially important since it provides the basis for long term effects on most other resources.

### Plant Successional Changes Following Harvest

In areas where harvest occurs, active management will replace natural succession of forest stands. All of the areas proposed for harvest in this SEIS are expected to be managed as even-aged stands. After clearcutting, stands will be restocked within five years, either by managed natural regeneration or by replanting. Where necessary, precommercial thinning will be done

by the twentieth year after harvest. Overall, stands will be managed on a 100-year rotation, with the exception of some LUD III and IV lands managed on extended rotations to 160 years and 120 years, respectively.

After replanting, managed forests grow through several distinctive successional stages. Different components dominate the stand at different stages, and the overall forest structure changes over time as well.

In the first five years of reforestation, the young stand receives maximum sunlight, which results in the rapid establishment of a variety of shrubs, forbs, and grasses. There is little incidence of damage or mortality from disease or infestation at this stage. The changed structure of the young stand affects the structure of adjacent stands; windthrow increases with greater wind exposure, and understory development accelerates due to increased light into the stand.

In years 5 to 20, seedlings grow into a vigorous stand of trees averaging about 19 feet in height and one to three inches diameter at breast height (DBH). Understory production is at its highest at this stage, especially in blueberry-dominated sites. Larger dead materials from the original stand begin to decompose, and the stand edge stabilizes, resulting in less windthrow.

At the end of this successional stage, the stand may be precommercially thinned, leaving a species composition of about 60 percent western hemlock, 40 percent Sitka spruce, and less than 2 percent cedar.

At a stand age of 20 to 50 years, tree growth is very rapid, with a gain of about one foot in height per year, and diameter growth of more than five inches every 10 years. Tree crowns begin to grow closer together, while the understory changes from a dense shrub, herb, and seedling-dominated structure to one of dense moss. Stands which have been precommercially thinned will have a two-layered canopy, with hemlock in the lower story. Canopy closure will occur more slowly in precommercially thinned sites.

In years 50 to 80, the stand remains closed. Little sunlight reaches the forest floor, and the understory continues to be dominated by moss. Tree diameter growth slows to about one inch every ten years, as competition between trees increases. It is not currently economically feasible to precommercially thin stands at this age, but precommercial thinning would increase understory growth and diversity, and would also result in greater tree diameter growth.

In years 80 to 100, the stand becomes mature. Some trees may die, while others become clearly dominant in size. Diameter growth slows to less than one inch every ten years. Moss continues to dominate the understory, except in places where the canopy has opened and allowed sufficient light for herbaceous plants. These structural characteristics continue into the later stages of the stand (100 to 160 years), with continued slow growth and occasional openings in the canopy.

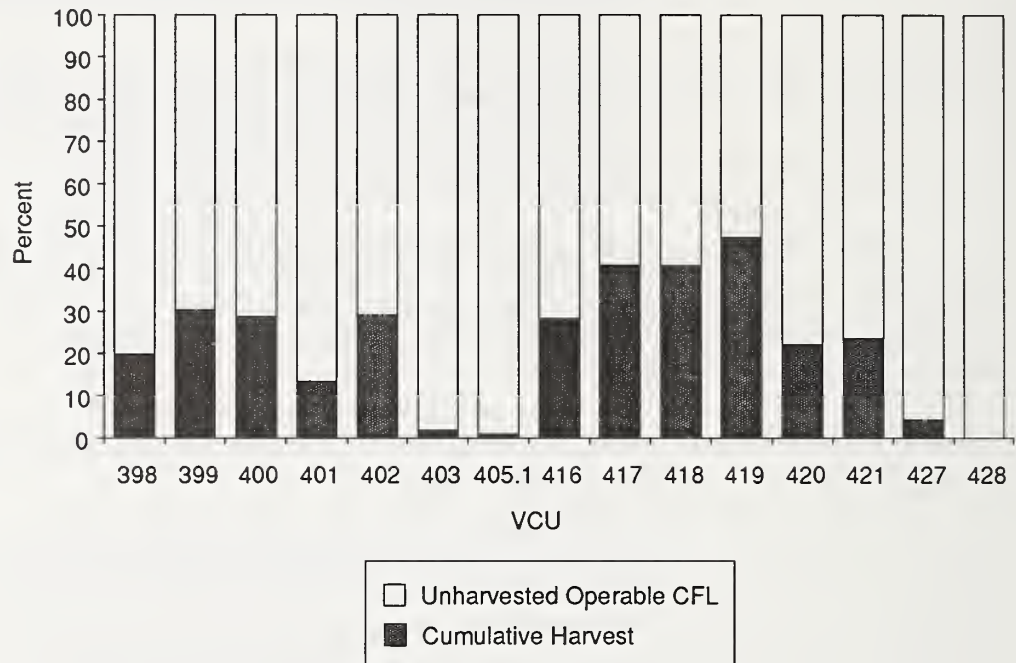
## Projected Timber Harvest through 2011

The Multi-Entry Layout Process (MELP) was used to project reasonably foreseeable road development and harvest in the Life of Sale Plan (Forest Service 1982). The purpose of the 2011 projected harvest is to provide information by which to analyze long-term and cumulative effects, rather than to begin planning the harvest units. Actual harvest units through 2011 would be laid out and analyzed for site specific impacts in five-year or other suitable long-range planning periods.

Figure 4-2 shows the percentage of harvest projected for each VCU by 2011, as well as the percentage of remaining operable CFL. By 2011, cumulative harvest in each VCU would range from zero (in VCUs 403, 405.1, 427, and 428) to 35.2 percent (in VCU 419) of the operable CFL. For Analysis Area 12, 23.8 percent of the operable CFL would be harvested by 2011, with 76.2 percent remaining available for harvest in the rotation.

Figure 4-2

## Percentage of Cumulative Operable CFL for Projected Harvest by 2011



SOURCE: Multi-Entry Layout Process database, Sitka Area Supervisor's Office, Petersburg, AK.

The volume available for harvest in the Life of Sale Plan was based on TLMP aerial photo point inventory data. Stand examinations conducted for MELP recorded more acreage of Volume Classes 6 and 7 than TLMP aerial photo point inventory (see Figure 3-1), suggesting that more volume may be present on the acreage scheduled for harvest by the Life of Sale Plan. Until TLMP is revised, however, more precise data are not available.

### Mature and Overmature Timber

All timber stands proposed for harvest in the action alternatives are mature or overmature and are well beyond the point of culmination of mean annual increment or the age of maximum average annual growth of the stand. They are representative of uneven-aged western hemlock stands that commonly take hundreds of years to develop under natural conditions if they are not manipulated by intensive forest management practices or changed by natural events such as windthrow.

The reasonably foreseeable and long-term effects of the timber harvest made available under ANILCA will be the conversion of over half of the commercial forest land to second-growth stands. This is less than half of all forest lands in Analysis Area 12.

### Second-Growth Stands

The open conditions created in clearcuts allow both Sitka spruce and western hemlock to regenerate rapidly. Even-aged stands usually contain from 10 to 75 percent spruce depending on the soil type and the age of the stand. On average, the volume of spruce in even-aged stands 75 to 100 years after harvest is about 50 percent (Taylor 1934) compared to 28 percent



in mature and overmature stands. With the use of silvicultural practices such as precommercial thinning, an additional 10 percent or more increase in the spruce component is expected.

Although log quality in second-growth stands is expected to be lower than in mature and overmature stands, even on sites that have been precommercially thinned, total yield per acre is expected to be higher in second-growth stands. The lower quality will be reflected in the log grades (sizes), with second-growth timber stands having fewer higher grade logs than existing mature and overmature stands. In addition, second-growth stands will have less volume in the larger diameter classes. Nevertheless, total yield per acre will be significantly greater in second-growth stands than in mature and overmature stands. The long-term results of precommercial thinning is the production of more useable fiber. Precommercial thinning also allows the Forest Service the option of reducing the rotation age because merchantable size logs are produced sooner on thinned sites than in areas not thinned.

Most second-growth stands will exhibit less variation in tree diameter and height than the mature and overmature stands they replace. For unmanaged second-growth stands average diameters will range from 10.5 inches on the poorer sites (site index 85) to 17.2 inches on the best sites at 100 years of age (site index 140) (Taylor 1934). With several precommercial thinnings it is possible to produce average stand diameters that approximate old-growth averages. On the better sites average diameters of 20 to 21 inches are possible in 100 to 110 years (Forest Service 1986c).

### Timber from Private Lands

On Kuiu Island, two areas of possible land selection and two areas of potential land conveyance could affect the amount of timber available to APC. The volume of timber, however, is expected to be small compared to the volume planned for in the 1986-90 FEIS. The areas selected for conveyance include portions of VCU 400, which have been selected by the State of Alaska as an aesthetic buffer around the State Marine Park. No timber harvest by the State would be expected there. A portion of land in VCU 417 (No Name Bay) has been selected by the State as a possible location for a rural community development. Only minor amounts of timber harvest would be expected to make room for the community. It is assumed that this land, if conveyance occurs, would be subdivided and sold as individual lots.

Long-term cumulative effects if Sealaska Corporation were to select land in Analysis Area 12 are unlikely to result. As previously stated, 4,500 acres of land in VCUs 398 and 399 have been identified for selection by Sealaska Corporation. The probability of this land being conveyed to Sealaska is low. On the 4,500 acres that could be conveyed, the timber available for harvest is of low volume with difficult access.

## Transportation

Forest roads are classified in relation to their service life as either short-term (10 years or less design life) or long-term (20 years and greater). Short-term roads are developed and operated for a limited time period and cease to exist as a transportation facility after the purpose for which they were constructed is completed and the occupied land is reclaimed and managed for natural resource purposes. Short-term roads are needed for one entry only and not needed for future harvest, management activities or other purposes. Drainage structures can be removed with minimum environmental damage and ground conditions permit practical obliteration. Obliteration of these short-term roads is an erosion control obligation of the timber purchaser and cannot be waived. Obliteration may be allowed to occur by natural revegetation. The natural vegetation that occurs on most temporary roads in southeast Alaska is alder. These roads are not included in the forest development road inventory. They are constructed and obliterated under the terms of the timber sale contract as short-term roads. The cost of construction and obliteration is included in the purchaser's logging costs. These roads are often called "spur roads".

## 4 Environmental Consequences



Short-term road miles proposed in Analysis Area 12 include: 9.7 for Alternative 2, 11.1 for Alternative 3, 10.2 for Alternative 4, and 10.0 for Alternative 5.

Long-term roads are developed and operated for long-term land management and resource utilization needs. Long-term roads are needed for future harvest and timber management, and other resource management needs that require continual or intermittent access. It may not be practicable to obliterate or remove drainage structures in these roads due to a high potential for environmental damage. It may be more economical to retain them for long-term use rather than to obliterate them. These are forest development roads and are constructed either under the terms of the timber sale contract as specified roads or under a formal road construction contract. These roads are sometimes referred to as "system roads".

All information on road miles presented in this document feature forest development roads and do not include short-term road miles. Figure 4-3 is a 1978 view of a long-term transportation system for the Tongass National Forest. This long-term projection was updated for scheduled roads during the 1985-86 TLMP Amendment. The 1978 projected system may appear to be nonresponsive to current issues such as a road connecting Hoonah to Tenakee Springs (H. R. 987). The EIS and ROD for projects such as this Supplement provide the responsible official an opportunity to address current transportation issues.

The environmental consequences from forest development roads can be compared in terms of road density and acres of forest removed from natural resource production by roadway clearing widths.

Road density is defined by the number of miles of forest development road in a square mile. Generally speaking, the higher the road density, the higher the risk of environmental impacts. Road density environmental impact risks are minimized and mitigated by standards and guidelines which direct the road location, design, construction and operation. Tables 4-30 and 4-31 display current road densities, projected road densities by alternatives and road densities through the foreseeable future by VCU in Analysis Area 12. Table 4-32 shows projected facilities anticipated through the life of the sale.

The clearing widths required for forest road development are dictated by the steepness of the terrain and the road design standard. Steeper terrain with high design standards generally produce wider clearing limits resulting in a greater number of acres cleared. Clearing limits can be modified, within the limits of driver safety, when the road parallels fish streams and beaches. Table 4-33 compares road clearing acres in each VCU by alternative.

Once new roads have been constructed into a previously unharvested watershed, there is likely to be pressure to continue their use in the future. The resulting activity could affect wildlife populations or wildlife use of the habitats due to additional access for hunters, pressure to use the watershed for recreation activities, and re-entry for timber harvesting.



Figure 4-3

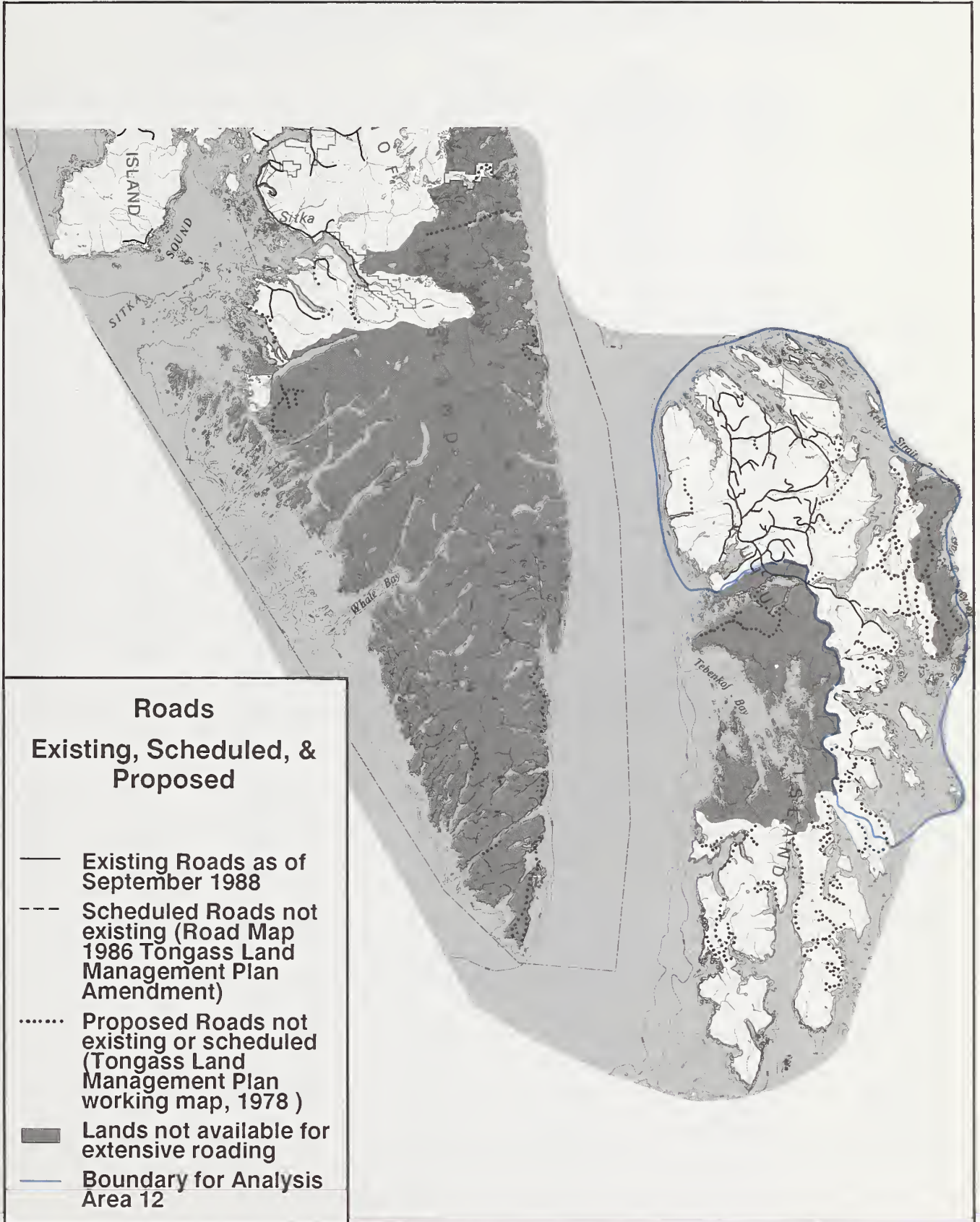




Table 4-30

## Proposed Road Construction and Road Density

VCU	Existing <sup>1</sup>	Alternative			
		2	3	4	5
<i>Miles of Road</i>					
398	2.1	0	0	0	0
399	27.7	4.2	4.2	4.9	4.9
400	26.1	9.5	1.0	1.0	1.0
402	40.5	0	0	0	0
403	6.7	0	0	0	0
405	0	0	2.5	0	0
416	0	0	0	0	0
417	0	0	7.5	0	0
418	0	0	4.0	0	0
419	10.90	0	0	0	6.2
420	4.5	8.6	8.6	8.6	8.6
421	34.2	4.9	8.9	5.5	8.9
Total	152.7	27.2	37.3	23.4	29.6
<i>Road Density<sup>2</sup></i>					
398	0.12	0.12	0.12	0.12	0.12
399	0.74	0.85	0.85	0.87	0.87
400	0.60	0.81	0.62	0.62	0.62
402	0.83	0.83	0.83	0.83	0.83
403	0.15	0.15	0.15	0.15	0.15
405	0	0	2.27	0	0
416	0	0	0	0	0
417	0	0	0.38	0	0
418	0	0	0.24	0	0
419	0.36	0.36	0.36	0.36	0.56
420	0.08	0.25	0.25	0.25	0.25
421	0.65	0.74	0.82	0.82	0.82

SOURCE: SEIS Planning Record.

<sup>1</sup> Existing road miles include roads authorized by the Alaska Federal District Court in the non-deferred VCUs.

<sup>2</sup> Road density is defined as the miles of road per square mile.

Table 4-31

**Projected Road Construction (Miles) and Road Density Through 2011**

VCU	Existing Roads <sup>1</sup>	Projected New Construction	Total Projected Roads	Road Density <sup>2</sup>
398	2.1	0	2.1	0.12
399	27.7	29.1	56.8	1.52
400	26.1	46.0	72.1	1.65
402	40.5	35.4	75.2	1.55
403	6.7	0	6.7	0.15
405.1	0	2.5	2.5	2.27
416	0	58.4	58.4	2.08
417	0	31.6	31.6	1.62
418	0	24.6	24.6	1.46
419	10.9	38.5	49.4	1.63
420	4.5	65.2	69.4	1.32
421	34.2	78.3	112.5	2.14
Total	152.7	409.6	562.3	1.36

SOURCE: SEIS Planning Record.

<sup>1</sup> Existing road miles include roads authorized by the Alaska Federal District Court in non-deferred VCUs.

<sup>2</sup> Road density is defined as the miles of road per square mile.

Table 4-32

**Existing and Projected Log Transfer Facility (LTF), Logging Camp and Administrative Site Construction Through 2011**

Site	Facility	Status	Estimated Service Life	Estimated Cycle of Entry
No Name Bay	LTF	Planned	Short Term	Intermittent
	Camp	Planned	Short Term	Intermittent
	Admin	Planned	Short Term	Intermittent
Port Camden	LTF	Non-Existing	Short Term	Intermittent
	Camp	Non-Existing	Short Term	Intermittent
	Admin	Non-Existing	Short Term	Intermittent
Saginaw Bay	LTF	Existing	Short Term	Intermittent
	Camp	Disassembled	Short Term	Intermittent
	Admin	Disassembled	Short Term	Intermittent
Rowan Bay	LTF	Existing	Long Term	Continuous
	Camp	Existing	Long Term	Continuous
	Admin	Existing	Long Term	Continuous

SOURCE: SEIS Planning Record.

Table 4-33

## Clearing Requirement for Road Development (Acres)

VCU	Alternative			
	2	3	4	5
398	0	0	0	0
399	26.5	26.5	30.9	30.9
400	59.9	6.3	6.3	6.3
402	0	0	0	0
403	0	0	0	0
405.1	0	15.8	0	0
416	0	0	0	0
417	0	47.3	0	0
418	0	25.2	0	0
419	0	0	0	39.1
420	54.2	54.2	54.2	54.2
421	30.9	56.1	56.1	56.1
Total	171.5	231.4	147.5	186.6

SOURCE: SEIS Planning Record.

## Wildlife

The primary impacts on wildlife result from changes in habitats. Therefore, the reasonably foreseeable effects to the end of the APC Long-Term Timber Sale (year 2011) were estimated by calculating the acres of each VCU that would be harvested up to that date. Amounts of habitat projected to be harvested were used to evaluate effects on emphasis species.

The location and amount of timber harvest acreage and the resulting effect on wildlife habitats was projected for the 100-year rotation ending in the year 2080 presented in the 1986-90 FEIS (Forest Service 1986b, page 4-247). For this supplemental analysis, reasonably foreseeable effects were calculated until the end of the long-term timber sale (2011). Consequently, the effects on wildlife habitats were proportionally reduced from the estimates presented in the 1986-90 FEIS. This method was used because the precise location of the timber harvest within the VCUs to the end of the sale has not been determined. The estimated acreage and percent of unaffected wildlife habitat remaining timber harvest activities through 2011 is displayed in Table 4-34.

### Wildlife Habitats

It is estimated that 79 percent of the forested habitat in Analysis Area 12 would remain unaffected by timber harvest activities through 2011 (Table 4-34). The percent of unaffected forest habitat remaining by VCU varies from 64 percent in VCU 417 to 100 percent in VCU 428. The 21 percent of forested habitat affected would be in various stages of forest succession following timber harvest. These areas would provide varying wildlife habitat values as the forest matures. Timber harvest increases the number of forage areas and forage production due to sprouting vegetation. However, this would be a temporary condition because the forest canopy closes with increased tree growth. As the canopy closes and matures, the hiding and thermal cover values increase. Precommercial thinning helps to balance the forage and cover values. In varying degrees, changing habitat values, due to forest succession, will affect the habitats and species discussed below.



Table 4-34

**Wildlife Habitats Remaining After Projected Harvest Through 2011**

VCU	Forested	Deer Winter Range	Inland Wetland	Beach Fringe	Estuarine Fringe	Streamside Riparian
<i>Acres</i>						
398	3,714	2,756	— <sup>1</sup>	2,058	— <sup>1</sup>	— <sup>1</sup>
399	15,140	2,215	1,578	1,455	1,886	112
400	16,736	10,356	589	1,849	2,842	138
401	7,694	5,327	— <sup>1</sup>	1,718	— <sup>1</sup>	— <sup>1</sup>
402	14,674	3,047	674	1,248	1,401	368
403	17,922	12,761	3,351	1,673	— <sup>1</sup>	67
405.1	1,047	64	160	— <sup>1</sup>	— <sup>1</sup>	112
416	10,414	4,363	538	1,924	70	445
417	5,818	3,482	798	1,391	— <sup>1</sup>	— <sup>1</sup>
418	4,669	1,837	870	591	1,069	82
419	8,076	2,671	1,102	1,169	2,119	151
420	12,511	5,470	2,405	2,574	4,374	45
421	16,672	1,913	1,757	724	1,536	68
427	2,080	1,350	— <sup>1</sup>	975	— <sup>1</sup>	— <sup>1</sup>
428	9,357	9,200	— <sup>1</sup>	1,414	157	— <sup>1</sup>
Total	146,524	66,811	13,822	20,763	15,453	1,589
<i>Percent</i>						
398	75	100	— <sup>1</sup>	97	— <sup>1</sup>	— <sup>1</sup>
399	73	81	87	89	98	98
400	76	73	83	90	99	96
401	94	91	— <sup>1</sup>	82	— <sup>1</sup>	— <sup>1</sup>
402	73	68	91	91	99	94
403	98	100	100	100	— <sup>1</sup>	100
405.1	99	100	100	— <sup>1</sup>	— <sup>1</sup>	100
416	76	82	75	88	87	91
417	64	74	60	72	— <sup>1</sup>	— <sup>1</sup>
418	70	84	76	95	91	85
419	74	75	98	76	88	95
420	79	81	82	90	92	70
421	76	82	88	86	98	99
427	96	100	— <sup>1</sup>	100	— <sup>1</sup>	— <sup>1</sup>
428	100	100	— <sup>1</sup>	100	100	— <sup>1</sup>
Total <sup>2</sup>	79	85	86	89	94	93

SOURCE: SEIS Planning Record.

<sup>1</sup> None of this habitat was found in the inventory.

<sup>2</sup> This value represents the percent of pre-harvest habitat remaining in the entire analysis area.

## Deer Winter Range

It is estimated that 85 percent of the deer winter range in Analysis Area 12 would remain unaffected by timber harvest activities through 2011 (Table 4-34). The percent of unaffected deer winter range remaining by VCU varies from 68 percent in VCU 402 to 100 percent in VCUs 398, 403, 405.1, 427, and 428. The affected 15 percent would undergo forest succession and the associated changes in habitat values. The changes in habitat capability values are most pronounced in deer winter range. The Suring, et al. model for Sitka black tailed deer (Consolidated Appendix, Volume III, E-1) quantifies projected changes resulting from harvesting existing timber within the winter range.

The period from 0 to 5 years following harvest is characterized by a maximum of solar radiation resulting in a large increase in the amount and diversity of browse for deer. Harvest within deer winter range, however, removes the overstory which otherwise intercepts snow and provides shelter for deer. In units under 800', for example, the model projects a maximum habitat capability reduction from 70 to 100 deer per square mile to 50 deer per square mile in the younger forest.

From 5 to 20 years following harvest the new forest continues to grow. Shrub cover reaches a maximum and trees begin to reach above woody stemmed shrubs. The young forest is often precommercially thinned during the end of this period, resulting in an increase in some forage production. The Suring model projects that winter range habitat capability remains at 50 deer per square mile in the example of maximum change described above. From 20 to 50 years and beyond, the new forest experiences very rapid growth, with the crowns of the trees beginning to touch and eventually closing. The value to deer for hiding and thermal cover increases, but the browse available in these new stands is reduced by the competition with the trees. Shrubs begin to be replaced by moss. The Suring model projects that habitat capability in winter range is further reduced to 10 deer per square mile in the example being described. This habitat capability would remain relatively unchanged in second growth forests managed under a 100-120 year rotation.

Implementation of Alternative 2 would result in a 573 acre reduction in deer winter range. Alternative 3 would reduce deer winter range by 408 acres, and Alternatives 4 and 5 by 307 acres. The percent of acres remaining following the 1990 operating period range from 91 percent with Alternatives 2 and 3 to 92 percent with Alternatives 4 and 5 (see Tables 4-6 and 4-7 for reductions by VCU).

## Inland Wetland

An estimated 86 percent of the inland wetland habitat in Analysis Area 12 would remain unaffected by timber harvest activities through 2011 (Table 4-34). The percent of unaffected inland wetland habitat remaining by VCU varies from 60 percent in VCU 417 to 100 percent in VCUs 403 and 405.1. Very little inland wetland habitat is proposed for harvest under the alternatives. Under Alternative 3, 1 percent would be altered, while less than 1 percent would be altered by the other alternatives. A total of 152 acres would be affected in VCU 417 under Alternative 3 (see Table 4-8 for acres affected by VCU).

## Beach Fringe

Eighty-nine percent of the beach fringe habitat in Analysis Area 12 is estimated to remain unaffected by timber harvest activities through 2011 (Table 4-34). The percent of unaffected beach fringe habitat remaining by VCU varies from 72 percent in VCU 417 to 100 percent in VCUs 403, 427, and 428. No beach fringe habitat would be altered by the proposed harvest in any of the alternatives.

## Estuarine Fringe

It is estimated that 94 percent of the estuarine fringe habitat in Analysis Area 12 would remain unaffected by timber harvest activities through 2011 (Table 4-34). The percent of unaf-

affected estuarine fringe habitat remaining by VCU varies from 88 percent in VCU 419 to 100 percent in VCU 428. No estuarine fringe is proposed for harvest under any alternative.

## Streamside Riparian

It is estimated that 93 percent of the streamside riparian habitat in Analysis Area 12 would remain unaffected by timber harvest activities through 2011 (Table 4-34). The percent of unaffected streamside riparian habitat remaining by VCU varies from 70 percent in VCU 420 to 100 percent in VCUs 403 and 405.1. A minor amount of streamside riparian habitat is located in proposed harvest units. A total of 8 acres would be affected in VCU 402 under all of the action alternatives. Alternative 5 would harvest an additional 8 acres in VCU 419 (see Tables 4-10 and 4-11).

## Old-Growth Conditions

Chapter 3 discussed old growth as a prescription used in the 1986-90 FEIS (Forest Service 1986b). The impacts of proposed harvest activities on those prescribed acres are displayed by alternative in Table 4-12. Future long-term prescriptions for old-growth habitat conditions will be considered in a revision of the Tongass Land Management Plan, which is currently in progress. The greatest impact to old-growth habitat would occur under Alternative 2 with the proposed road construction and harvest planned for West Security Bay in VCU 400. A maximum of 499 acres would be harvested under Alternative 2 and a low of 165 acres would be harvested under Alternative 4. Alternative 1 proposes no additional harvest (See Table 4-12).

## Wildlife Species

### Sitka Black-tailed Deer

The habitat capability model used to analyze the effects of harvest through 1990 indicates less than a 2 percent potential reduction in deer numbers under all alternatives. This estimate reflects a potential reduction of deer ranging from 88 animals under alternative 2 to 166 under Alternative 4 of an estimated population of over 9000 deer (see Tables 4-13 and 4-14 for a complete analysis by VCU and minor harvest area).

It is estimated that 79 percent of the forested habitat and 85 percent of deer winter range would remain unaffected by timber harvest activities through 2011 (Table 4-34). The resulting change in those habitats would probably lead to a reduced carrying capacity for black-tailed deer. The habitat capability model information indicates that project timber harvest proposed in Alternative 3 would reduce potential deer numbers to 88 percent of their 1961 level by 2015 and 79 percent by 2080 (Figure 4-4). Due to second growth closing in past clearcut areas, Alternative 1 (no action) would result in potential deer numbers being reduced an additional 1 percent by 2015 (91 percent of the 1961 level). By 2080, further reductions from second growth development would result in a potential population at 86 percent of the 1961 level.

Figure 4-5 shows the long-term effects of timber harvest on deer habitat capability resulting from the additional proposed harvest in MELP and TLMP. The habitat capability model indicates that potential deer numbers would be reduced to 86 percent of their 1961 level by 2011 and 68 percent by 2080. These projections include reductions from second growth development and additional harvest proposed in the long-term forest harvest plans mentioned above.

### Black Bear

Timber harvest effects on the black bear are not expected to be substantial. Their high use of streamside riparian, estuarine fringe and beach fringe habitats indicate the importance of these areas to black bears. The levels of harvest should give a relative indication of the cumulative effects on these animals. Very little harvest is proposed of important black bear habitat in this operating period. Alternatives 2, 3, and 4 propose harvest of 8 acres of riparian habitat, while alternative 5 proposes harvest of 16 acres (see Table 4-10). It is estimated that by 2011 these habitats would remain at 75 to 95 percent of the original amounts in most VCUs (Table 4-34).



*Sitka Black-tailed Deer*

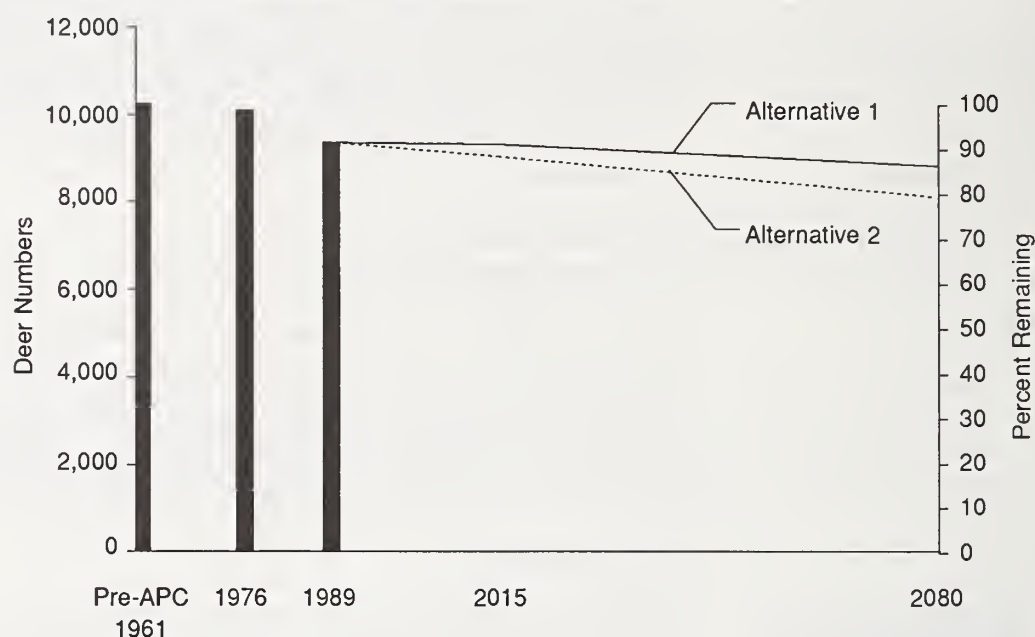


*Black Bear*



Figure 4-4

## Project Specific Effects on Potential Black-tailed Deer Habitat Capability Through One Timber Crop Rotation



SOURCE: Forest Service in consultation with ADF&G (SEIS Planning Record).

Figure 4-5

## Comparison of Potential Sitka Black-tailed Deer Habitat Capability Through One Timber Crop Rotation<sup>1</sup>



SOURCE: Forest Service in consultation with ADF&G (SEIS Planning Record).

<sup>1</sup> Includes effects due to projected harvest under MELP and TLMP.

Additionally, black bear have proven to be generally tolerant and compatible with human disturbance. A small decline of the black bear population is expected as some of the important habitat is harvested and as hunters harvest black bears under the sport and subsistence regulations.



*Pine Marten*

## Pine Marten

The habitat model used to analyze the proposed harvest through 1990 indicates less than a 2 percent potential reduction in potential marten numbers. This estimate reflects a potential reduction of 13 pine martens under Alternative 4, and 8 under Alternative 2 (see Tables 4-15 and 4-16).

It is estimated that 79 percent of the forested habitat would remain unaffected by timber harvest activities through 2011 (Table 4-34). The habitat reduction associated with timber harvest would probably lead to a proportional reduction in carrying capacity for the pine marten. The habitat capability model information indicates that project timber harvest proposed in Alternative 3 would reduce potential pine marten numbers to 55 percent of their 1961 level by 2015 and 2080 (Figure 4-6). Alternative 1 (no action) would result in no additional reduction of potential pine marten numbers by 2015 or 2080. The population would remain at approximately 58 percent of the 1961 level throughout this time period.

Figure 4-7 shows the long-term effects of timber harvest on pine marten habitat capability resulting from the additional proposed harvest in MELP and TLMP. The habitat capability model indicates that potential pine marten numbers would be reduced to 54 percent of their 1961 level by 2011 and 40 percent by 2080. These projections include reductions from second growth development and additional harvest proposed in the long-term forest harvest plans mentioned above.

Carrying capacity for the marten should increase again as regenerated forests in harvest units mature through the rotation. However, it is not expected that a stand will return to the carrying capacity for martens of the existing stand while managed on a 100-year rotation. Carrying capacity of the post-harvest stand may also be improved through implementation of the second-growth management program.



*Land Otter*

## Land Otter

Land otters generally occur in close proximity to the beach (Larsen 1983 and Woolington 1984) within areas identified as beach fringe habitat for the 1986-90 FEIS. A total harvest of 8 acres of otter habitat would result under implementation of Alternatives 2, 3 and 4. Alternative 5 would harvest 16 acres of riparian habitat. Under all alternatives, however, a minimum of 96 percent of the riparian habitat would remain through 1990. No beach fringe is proposed for harvest under any alternative.

It is estimated that 89 percent of the beach fringe habitat would remain unaffected by timber harvest activities through 2011 (Table 4-34). It should be noted that many harvest units within the beach fringe habitat have buffers left between the harvest unit and the beach. These measures should result in only small reductions of land otters by 2011.



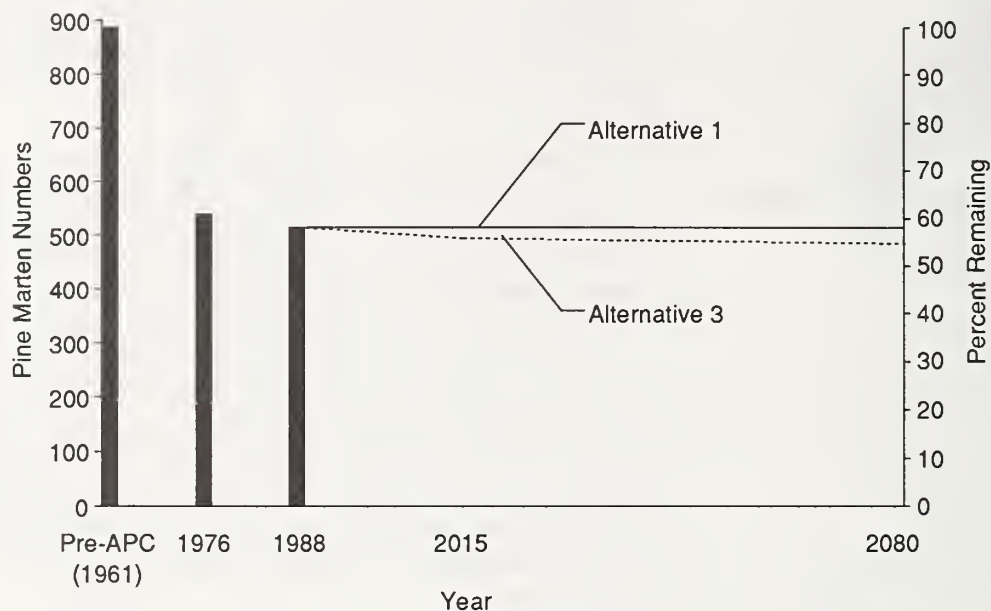
*Bald Eagle*

## Bald Eagle

It is estimated that the buffer zone of some additional eagle nest trees could be infringed upon by timber harvest activities to 2011. These infringements will be dealt with under a Memorandum of Understanding between the Forest Service and US Fish and Wildlife Service to assure that they would have no effect on carrying capacity for bald eagles (Forest Service 1984). Normal procedure is not to harvest near known nest trees. Harvest in beach fringe or estuarine fringe will proportionally reduce the capacity of the habitat to produce future nest trees.

Figure 4-6

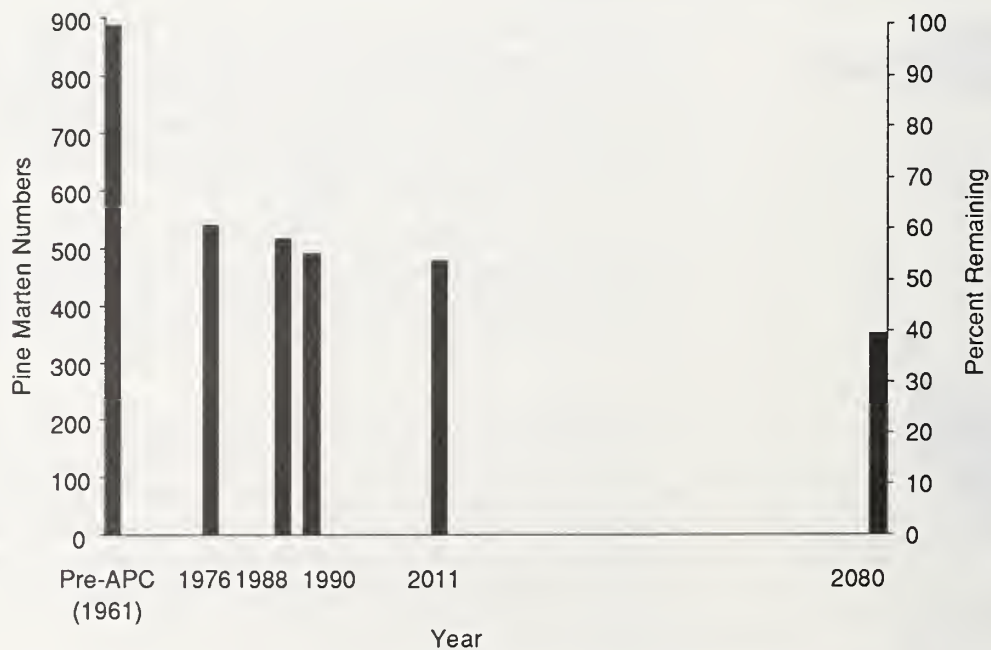
## Project Specific Effects on Potential Pine Marten Habitat Capability Through One Timber Crop Rotation



Source: Forest Service in consultation with ADF&G (SEIS Planning Record).

Figure 4-7

## Comparison of Potential Pine Marten Habitat Capability Through One Timber Crop Rotation<sup>1</sup>



SOURCE: Forest Service in consultation with ADF&G (SEIS Planning Record).

<sup>1</sup> Includes effects due to projected harvest under MELP and TLMP.





*Vancouver Canada Goose*

## Vancouver Canada Goose

Vancouver Canada geese nest in inland wetland, estuarine fringe, and forested habitats. Within these habitats they often select noncommercial or low-volume forested sites. Harvest of these habitats could affect Vancouver Canada geese. One percent or less reduction in inland wetlands would result under all harvest alternatives through 1990. Forested habitat affected would range from 2,656 acres under Alternative 4, to 3,120 acres under Alternative 3. This translates to a 2 percent change under Alternatives 3 and 5, and 1 percent under Alternatives 2 and 4.

It is estimated that 86 percent of the inland wetland, 94 percent of the estuarine fringe, and 79 percent of the forested habitats would remain unaffected by timber harvest activities through 2011 (Table 4-34). These levels of estimated timber harvest could reduce the carrying capacity for geese in Analysis Area 12. However, it is anticipated that the amount of reduction in carrying capacity would be small, and probably not proportional to the reduction in habitat as Vancouver Canada geese are probably not limited by the abundance of nesting habitats.

## Fisheries/Hydrology

To understand the general changes in watershed and stream conditions, and their affect on fisheries 30 to 50 years following timber harvest, it is useful to address two broad groups of stream systems: upland channels or mountainslope ravines, and lowland channels. Upland channels include mostly Class III AHMUs where the primary management objective is to protect water quality. These streams have little or no resident fish habitat. Lowland channels are primarily low gradient floodplain channels and moderate to low gradient alluvial fan and footslope channels. Lowland channels fall within the Class I and II AHMU categories where the primary management objective is to protect important anadromous and resident fish habitat.

### Changes to Upland Streams

Erosion and sedimentation from channel disturbance associated with construction of stream crossing structures and road use and maintenance could be expected to result in small increases in sediment input and transport. The majority of increased erosion occurs over a period of 2 to 5 years following construction. Short-term (1 to 2 days) water quality degradation near construction activity is likely. However, the likelihood of long-term impacts to downstream water quality (sediment or turbidity) or stream channel stability is generally low.

*Typical Pink Salmon Spawning Stream in Southeast Alaska*



Large organic debris (LOD) is important in some, but not all, upland Class III streams. Clear-cut harvesting along upland Class III channels would reduce large woody debris recruitment, thus reducing instream log step pools over time in some streams. Sediment storage capacity may be reduced, potentially resulting in more rapid routing of bedload sediment to downstream areas. The cumulative effects of changes in coarse sediment routing are unknown.

Upper bank erosion within upland v-notch channels may increase slightly following harvest due to windthrow of ravine timber. Increases in sediment delivery from upland channels would occur but should remain within the natural range of sediment discharge based on the results from sediment transport monitoring following timber harvest in a typical Southeast Alaska watershed.

Road construction and timber harvesting activities would increase the risk for mass wasting events such as debris torrents in Class III channels and debris avalanches from unstable mountain sideslopes. Although only a small percentage of natural and management-induced mass wasting directly impacts fish streams, accelerated erosion and sedimentation from management activities would likely result in some localized degradation of spawning gravels and fish rearing habitat.

Table 4-35 shows that the amount of upland stream within harvest units varies little among the action alternatives. Alternative 5, has 5 miles of upland streams within harvest units, more than any of the action alternatives. With 4.1 miles, Alternative 4 has the least miles of upland channels among the action alternatives. Alternative 1, the No-Action Alternative, would have none. The greatest impact would be in VCU 420, where each of the action alternatives have 1.9 miles of upland streams within harvest units.

## Changes to Lowland Streams

The implementation of riparian management prescriptions would substantially limit the amount of streamside harvest activity on Class I anadromous fish streams and Class II resident fish streams. This management approach should result in minimal changes to stream morphology and fish habitat condition. Riparian harvesting prescriptions are designed to minimize impacts related to streambank disturbance, canopy alteration, and large organic debris recruitment.

## Large Organic Debris/Channel Stability - Fish Habitat

Large organic debris, which is generally considered to be stable woody material at least 10 centimeters in diameter and 1 meter in length intruding into the stream, (AHMU handbook) is a key component for the maintenance of channel stability and for providing fish habitat in streams of Southeast Alaska. Recent research (i.e., Murphy et al. 1986, Heifetz et al. 1986, Murphy et al. 1987, Bryant 1980, and Bryant 1983) has demonstrated the importance of large organic debris for providing a diverse channel morphology, for maintaining channel stability, and for providing cover and refuge habitat for fish. Large organic debris declines over time and must be replaced by new inputs from streamside timber. Impacts of large organic debris should balance the natural depletion rate, otherwise debris dependent habitat will be impacted.

In order to provide a source for future recruitment of large organic debris, the harvest and regeneration of streamside trees needs to be carefully managed.

Activities proposed in the SEIS operating period have active streamside management techniques prescribed that are expected to maintain instream and future sources of large organic debris, which prevent degradation of channel stability. These measures should maintain fish production. However, the long-term consequences of active streamside management for large organic debris and channel stability have not been measured. Projections made by Sedell and Swanson (1984) based on their model of a managed stream system indicates that fish produc-

Table 4-35

**Miles of Upland and Lowland Streams Within Harvest Units<sup>1</sup>**

VCU	Alternative			
	2	3	4	5
<i>Lowland</i>				
399	0.0	0.0	0.0	0.0
400	0.8	0.0	0.0	0.0
402	1.2	1.2	1.2	1.2
418	0.0	0.2	0.0	0.0
419	0.0	0.0	0.0	0.0
420	0.0	0.0	0.0	0.0
421	0.0	0.0	0.0	0.0
Total	2.0	1.4	1.2	1.2
<i>Upland</i>				
399	1.0	1.0	1.0	1.0
400	0.7	0.0	0.0	0.0
402	0.2	0.2	0.2	1.0
417	0.0	0.3	0.0	0.0
418	0.0	0.2	0.0	0.0
419	0.0	0.0	0.0	0.9
420	1.9	1.9	1.9	1.9
421	0.9	1.0	1.0	1.0
Total	4.7	4.6	4.1	5.8

SOURCE: SEIS Planning Record.

<sup>1</sup> Includes streams that are within harvest units only, not those bordering units.

tion from managed streamside zones could potentially be increased, over a 120-year harvest cycle. Active streamside management increases fish biomass by providing openings in the canopy, which improves primary and secondary production, and by maintaining input of large organic debris that creates and maintains habitat. (Sedell and Swanson, 1984).

The assumptions utilized in the long-term projection of timber harvest for the 1986-90 study area includes not harvesting 80 percent of the timber volume within 100 feet on either side of Class I Aquatic Habitat Management Units (AHMUs). (This assumption has been carried through to the end of the contract and harvest rotation periods, 2011 and 2088, respectively). The intent is to ensure that streamside trees of suitable size and length will be available through the rotation to provide sufficient future sources of large organic debris and to maintain channel stability. The proposed 20 percent harvest in conjunction with a second-growth thinning program for past harvest units where second growth or alder is shading the stream will ensure that light penetration will be available to fuel increased fish biomass. The consequences of this type of program would at the minimum maintain the current production and may lead to sustained increased production.



## Stream Temperature

Thermal impacts (from elevated water temperature) are not anticipated to occur for the first harvest rotation (100 years) as a result of timber harvest. Fish Habitat Management Unit streamside timber guidelines anticipate 80 percent of the timber volume within 100 feet of streams will remain standing at the end of the contract. Application of the standards and guidelines will provide adequate streamside vegetation to eliminate potential stream temperature impacts.

A current aquatic research hypothesis speculates that increased winter temperature caused by timber harvest in Southeast Alaska may cause early emergence of fry from spawning gravels (Elliot 1985, Schwan et al. 1985). Early emergence could cause pink and chum fry to encounter a reduced food supply in estuaries and/or washout of coho fry during the spring runoff. However, elevated winter temperature and sufficient overwinter habitat could lead to a longer growing season for coho fry and juveniles yielding more smolts that may increase adult returns (Schwan et al. 1985). This is similar to the hypothesis presented by Sedell and Swanson (1984) in their discussion of active streamside management. A long-term watershed evaluation program specifically keyed to winter temperature conditions and the effects of timber harvest would be necessary to sort out the correct conclusion. The current assumption is that with 80 percent of the timber volume within 100 feet of streams standing at the end of the contract, winter temperature effects will be minimal and no detrimental impact on fish resources is anticipated.

## Nutrient Cycling

Available scientific evidence indicates that soluble nutrients are tightly bound in soil humus layers. Timber harvesting is unlikely to significantly influence nutrient loss from highly organic soils common in Southeast Alaska. Assuming fertilizers or herbicides are not used as silvicultural treatments in the study area, multi-entry harvest over the life of the sale should cause no significant long-term cumulative effects on stream nutrient budgets.

## Streamflow

As discussed in the watersheds section of this chapter, a search of literature shows timber harvest in excess of 25 percent for a single entry into an individual watershed may demonstrate a measurable impact upon stream flow. Increased stream flow may provide a deleterious effect to stream habitat, thus, causing a decline in fish population. Table 4-36 displays harvest acres of past, present, and a reasonably foreseeable future by VCU. The percent of watershed harvested is also provided. The total by VCU through 2011 would approximate the completion of initial entry, as assumed in the current forest plan. The scheduling of harvest over time is thought to provide for a recharge or recovery of the watershed being logged. In effect, as young trees reach a certain age, height and size they collectively begin to utilize as much or more water than the overmature stand they replaced.

In Southeast Alaska, very little data are available to aid in evaluating the potential long-term effects of second-growth forest on summer lowflows, however, the expected aggregate level of activity in a watershed can be used to make a professional judgment. The cumulative timber harvest over the rotation is projected to be generally less than 40 percent for individual watersheds in the 1986-90 study area (Forest Service 1986b, p. 4-259). Multi-entry sustained yield second-growth management should result in a variety of age classes in forest stands spread out over a watershed. These conditions would reduce the risk of significantly affecting summer runoff. Therefore, based on the current state of knowledge, the watersheds in the 1986-90 study area are not judged to be susceptible to long-term effects of vegetation change on summer low-flow conditions.

Table 4-36

**Area and Percentage of Watersheds Projected to be Harvested Through 2011<sup>1</sup>**

		Years Since Harvest at Year 2011			
VCU	Total Land	30+ Years	20-30 Years	<20 Years	Total 2011
<i>Acres</i>					
398	11,048	516	700	27	1,243
399	23,936	2,714	1,060	1,797	5,571
400	28,040	3,335	438	1,561	5,334
401	13,850	0	0	519	519
402	31,373	3,058	1,377	990	5,425
403	28,227	250	67	0	317
405.1	1,651	0	0	9	9
416	17,970	273	0	2,989	3,262 <sup>2</sup>
417	12,478	457	0	2,850	3,307 <sup>2</sup>
418	10,753	112	0	1,867	1,979 <sup>2</sup>
419	19,406	331	0	2,458	2,789 <sup>2</sup>
420	33,897	129	0	3,188	3,317 <sup>2</sup>
421	33,570	2,121	2,249	992	5,362
427	5,101	95	0	0	95
428	24,296	0	0	0	0
Total	295,596	13,391	5,891	19,247	38,529
<i>Percent</i>					
398		5	6	— <sup>3</sup>	11
399		11	4	8	23
400		12	2	6	19
401		0	0	4	4
402		10	4	3	17
403		1	— <sup>3</sup>	0	1
405.1		0	0	— <sup>3</sup>	— <sup>3</sup>
416		2	0	17	18
417		4	0	23	27
418		1	0	17	18
419		2	0	13	14
420		4	0	9	10
421		6	7	3	16
427		2	0	0	2
428		0	0	0	0
Total <sup>4</sup>		5	2	7	13

SOURCE: SEIS Planning Record.

<sup>1</sup> Percentages are based on the total acres within a VCU, rather than on the percentage of the VCU which falls within a watershed. Total harvest to year 2011 is based on the Life of Sale Plan prepared in 1982 and updated in 1986.

<sup>2</sup> Values shown indicate that the Life of Sale Plan volume scheduled has not been harvested as planned, but may be harvested at a higher rate later in the first entry.

<sup>3</sup> Harvested amount is less than one percent of total land area.

<sup>4</sup> This value represents the percent of projected harvest in the entire analysis area.

## Streamside Disturbance Effects

Blowdown of riparian buffer strips may result in increased bank erosion and possibly increase channel migration in Class I channel segments. Channel shifting associated with debris accumulations or changes in sediment load (bedload aggradation) may reduce the effectiveness of narrow riparian buffer strips in naturally unstable floodplain and alluvial fan streams over time.

The effects of accelerated mass wasting in upland channels and headwater areas on channel stability and habitat capability in downstream Class I stream segments is not well understood. Timber harvesting and road construction activities on high hazard soils will be limited thus minimizing the risk of cumulative sediment impacts on Class I and II streams within a given watershed.

As shown in Table 4-36, Alternatives 4 and 5 have the least amount of lowland streams within harvest units with 1.2 miles each. Alternative 2, has the most with 2 miles. Most of the impact would be in VCU 402, with 1.2 miles of lowland stream within harvest units in each of the action alternatives.

Long-term inputs of sediment from channel and bank disturbances would be minimal over the harvest rotation. Due to application of Aquatic Habitat Management guidelines the total miles of streambanks affected are anticipated to be small. Streamside areas with a vegetative buffer strip of undisturbed forest will have negligible stream channel disturbance and sediment inputs from harvest activities. Therefore, sedimentation resulting from stream channel disturbance is unlikely.

## Soils

The stability of soils varies a great deal, depending on such factors as parent material, drainage, drainage dissections (V-notches), slope gradient, and slope form. The events of greatest concern are slope failure and mass wasting, which is defined as the downslope movement of soil and organic material under the force of gravity, and includes debris flows, debris avalanches and debris torrents.

The most important factor in predicting mass wasting potential is slope gradient. Most soils in Southeast Alaska are subject to landslides at a gradient of about 67 percent (Swanston 1969). Once slopes exceed this gradient, their stability decreases significantly.

Soils mapped for Southeast Alaska have been rated as Extreme, High, Moderate or Low for mass wasting hazard (Integrated Resource Inventory Interpretations Handbook, unpublished). Hazard ratings help to predict the probability of slope failure in landscapes of various composition and form. Soils with extreme and high mass wasting hazards are expected to have an increased level of mass wasting above that for the overall average of the Forest. Soils associated with moderate and low mass wasting hazards are expected to have a mass wasting level below that of the overall average for the Forest.

Generally, poorly drained, fine-textured soils on very steep, highly dissected landforms are far more prone to mass wasting events than are well drained, deep, coarsely sorted soils on moderate gradients and smooth landforms.

Recent research on landslides in Southeast Alaska (Swanston 1989) concluded that most landslides occur in unique topographical situations (slopes in excess of 75 percent and hillslope depressions). Although over 90 percent of all landslides in the last 20 years were not related to logging or roads, logging and roads do increase the potential for landslides in a given site. Naturally occurring slides tend to be larger and travel further than logging related slides. Only 3 percent of all slides reach anadromous fish streams.

Mass wasting events will tend to occur with more frequency after harvesting, because the stabilizing root structure of trees has been removed. Typically, it takes 3 to 7 years of regrowth to establish enough interlocking root strength to stabilize the slope. After approximately 20 years, slope stability will have returned to normal in most cases.



### Extreme Hazard Soils

Factors which contribute to an extreme mass wasting hazard for a soil are very steep slopes (greater than 75 percent) with either frequent V-notch dissection, unstable parent materials, poor soil drainage, or evidence of past mass wasting. The Extreme rating applies to soil map units with the potential for frequent and large mass failures to occur naturally.

Under forest management such as timber harvest or road construction, these units have the highest probability of all rated soils for mass failure to occur. On-site investigations are necessary to determine the potential for mass failure and to anticipate how great an area could be impacted. Mitigation for mass failure hazards is generally ineffective. Sites with extreme mass wasting hazard may experience more than a five-fold increase in these events after timber harvest, and under some conditions may experience more than 10 times the average mass wasting experienced on the Forest under natural conditions.

Slope failures tend to occur in increasing numbers from 3 to 7 years after timber harvest, but taper off rapidly thereafter. Approximately 20 years after timber harvest, the site may be considered “reclaimed” from management-induced mass wasting. At this point, vigorous forest regeneration has strengthened the stability of the site, and slope failures appear to occur in frequency and magnitude equal to that of natural conditions. The steepest portions of some fine-textured soils may require much more than the 20 years to recover because of continued raveling and erosion of soil from the site of slope failure.

### High Hazard Soils

Soils rated as High for mass wasting hazard will be found under the following conditions: (1) very steep slopes (greater than 75 percent) with infrequent V-notch dissection, stable parent materials, and well drained soils; (2) steep slopes (55 to 75 percent) with frequent V-notch dissection and well drained soils; (3) steep slopes (55 to 75 percent) with infrequent V-notch dissection and inadequately drained soils, or (4) moderately steep slopes with frequent dissection, unstable parent materials, and/or poorly drained soils.

Standard management practices may have only limited success, and on-site investigations are necessary to determine the need for mitigating measures. After timber harvest, sites with high mass wasting hazard may experience 5 to 10 times the average mass wasting occurring on the Forest under natural conditions. As is true of extreme hazard soils, slope failures may occur in increasing numbers from 3 to 7 years after timber harvest and then taper off. Mass wasting and slope failures on these soils are usually considered to be “reclaimed from management-induced mass wasting after about 15 years.

### Moderate Hazard Soils

Soils rated as moderate for mass wasting are generally found in the following conditions: steep slopes (55 to 75 percent) with infrequent V-notch dissection, stable parent materials and well drained soils; moderately steep slopes (35 to 55 percent) with frequent V-notch dissection and well drained soils; moderately steep slopes (35 to 55 percent) with infrequent V-notch dissection and inadequately drained soils, or gentle slopes (5 to 35 percent) with frequent dissection, unstable parent materials and/or poorly drained soils. Standard management practices are usually successful. After timber harvest, moderate hazard soils may experience as much as 5 times the mass wasting experienced on the same soil under natural conditions. Slope failures may occur in increasing numbers from 3 to 7 years after timber harvest and taper off rapidly thereafter. The site can be considered “reclaimed” from management-induced mass wasting when slope failures appear to occur in frequency and magnitude equal to that of natural conditions.

### Low Hazard Soils

Soils rated as Low for mass wasting hazard are in generally gently sloping and/or rolling topography. In these cases, steep slope gradients will not be combined with dissection, parent materials, or drainage conditions to pose significant mass wasting hazards. Both natural and management-induced mass wasting events are rare and small in extent. Unlike the other soils, these soils will not experience the average five-fold increase in mass wasting after timber harvest. Mitigation is generally effective in reclaiming these sites.

## Recreation

By the year 2011, there would be definite long-term changes to recreation opportunities in Analysis Area 12 with a shift from the pristine, primitive and semi-primitive opportunities that dominate today to a mix of primitive, semi-primitive, and roaded recreation opportunities. Forest Service road management activities, including standards, maintenance, and closures, would directly affect the quality of roaded recreation opportunities. Some closed roads may be turned into hiking trails while others may be managed for ORV use. Because the State has no future plans to service Kuiu Island with the Alaska State Ferry, most roaded recreation opportunities would be available only to members of the community(s) on Kuiu Island. These plans also suggest that existing low recreational use on Kuiu Island would be maintained into the future. Timber harvest along beaches would probably have the greatest impact on recreationists, because most recreation activities in Analysis Area 12 are beach oriented.

Following is a discussion of the long-term effects on recreation expected to occur in each VCU from the Life of Sale Plan as scheduled by MELP.

### **VCU 398 - Keku Island**

Road construction and harvest would change existing semi-primitive opportunities to roaded; however, increased use is not expected.

### **VCU 399 - Saginaw Bay**

Recreation opportunities at the head of Saginaw Bay, especially near the immediate shoreline, are likely to remain semi-primitive. Recreational boaters, however, may notice clearcut units on the adjacent hillsides. Those who desire an environment free of human development would be impacted the most.

Road construction and harvest units on the southwest part of the bay would increase the opportunities for roaded recreation. Future visitors to the area could expect to see increased development and other users.

Additional recreation pressure may occur within the area as a result of the State's development of selected land northeast of the VCU. Nevertheless, overall recreation use within the VCU is expected to remain low.

### **VCU 400 - Security Bay**

Much of the area around Security Bay would provide roaded recreation opportunities. The land east of Security Bay would continue to provide opportunities for roaded recreation, and evidence of human activity would be noticeable. The area west of the Bay would change from semi-primitive to roaded. The water oriented user would no longer experience a completely natural environment.

Alpine areas on the extreme western side of the VCU would continue to provide for a primitive recreational experience. Access is confined to cross-country travel, and low visitor use is expected.

A change in existing nonmotorized recreation opportunities can be expected at the southern end of the Bay if road construction occurs around the salt chuck. Those seeking activities in a natural setting would be impacted the greatest. The degree of impact would depend upon the scale of the planned developments.

### **VCU 401 - Washington Bay**

Harvest operations would likely affect only isolated areas of the shoreline. In these locations a shift from semi-primitive to roaded modified opportunities would occur. The low recreational use is currently water-oriented and little change in use is expected. None of the action alternatives propose harvest in this VCU.

*Security Bay***VCU 402 - Rowan Bay**

Continued harvest operations in this area would have minimal effects on visitor experiences since the area has already been modified by roads, harvest units, and the Rowan Bay LTF. Potential harvest units both north and south of the Bay entrance would shift ROS classifications from semi-primitive nonmotorized to roaded modified. New roads surrounding the Bay would permit increased opportunities for access by the limited number of residents at the Rowan Bay Camp. Each of the action alternatives would harvest similar amounts of timber from this VCU without building additional system roads. Accordingly, these alternatives would have similar and very minor effects on recreational activities in this VCU.

**VCU 403 - Bay of Pillars**

No logging is planned under the current land use designation; therefore, this area would continue to provide primitive experiences.

**VCU 405.1 - Aleck's Lake**

Under Alternative 3, the road corridor would change the existing primitive opportunities here to roaded modified. This road corridor would provide roaded access to within less than one mile of Aleck's Lake in the Tebenkof Wilderness. The other alternatives would leave this VCU available for primitive recreational activities.

**VCU 416 - Alvin Bay**

Logging and road building along the shores of Alvin and Reid Bays may displace some of the current recreation users seeking solitude. In addition, boaters in Reid Bay who seek a remote experience could be adversely impacted as development becomes more visually evident.

Much of the interior land in this VCU has limited access and is absent of human development, favoring primitive recreation experiences. Future timber operations would open this country to roaded opportunities. This VCU is being considered for Wilderness designation in H.R. 987 and would remain unroaded in all alternatives except Alternative 3.



## 4 Environmental Consequences

### **VCU 417 - No Name Bay**

The majority of land within this VCU would be classified as roaded modified. Limited salt-water access to the road system could be possible by use of the proposed log transfer site. As a result, recreation experiences may be influenced by developments. Demand for fishing and hunting in an interior lake system may increase as roads provide easier access. A proposed road could bisect the canoe/kayak portage trail that connects Alecks Lake to No Name Bay. This VCU is being considered for Wilderness designation in H.R. 987 and would remain unroaded in all alternatives except Alternative 3.

### **VCU 418 - Seclusion Harbor**

Proposed road building and timber harvest in this area could potentially displace those users seeking solitude. Affected users could include waterfowl hunters and anglers in Seclusion Harbor and the adjacent Salt Lagoon near the eastern boundary of the VCU. This VCU is being considered for Wilderness designation in H.R. 987 and would remain unroaded in all alternatives except Alternative 3.

### **VCU 419 - Threemile Arm**

Recreation opportunities within the VCU would shift from primitive and semi-primitive non-motorized to roaded modified. Road construction and harvest activities near the shore may negatively impact boaters and those recreation users who seek remoteness and isolation. The quality of recreation experience may decrease for users of the estuarine area at the head of the bay. Timber harvest near the canoe/kayak portage trail that connects Threemile Arm to Port Camden may result in some recreational impacts. None of the alternatives in this SEIS would

*Threemile Arm*



harvest timber at the head of the bay or near the portage trail. Only Alternative 5 proposes to harvest timber in this VCU, and all timber harvest and associated road construction would be on the northeast side of the bay.

The extreme western part of VCU 419 would remain in its primitive condition and would continue to provide opportunities for remote travel in alpine country.

## **VCU 420 - Port Camden**

Timber operations east of Port Camden and associated road construction would result in a shift of recreation opportunities along the spectrum to roaded modified. Some users seeking more primitive opportunities would be displaced to other areas where human activity is not evident. How well the timber activities harmonize with the natural landscape would determine the degree of impact. All of the action alternatives propose some timber harvest and associated road construction east of Port Camden.

## **VCU 421 - Kadake Bay**

Throughout most of the VCU recreation use would center around experiences resulting from a modified landscape. Semi-primitive opportunities near the Bay and cabin, however, would remain unchanged.

Timber activities along the eastern half of the VCU and along its northern boundary would change existing primitive recreation opportunities to roaded. Alternative 2 would harvest a relatively small amount of timber in this VCU. Alternatives 3, 4, and 5 all have more timber harvest and associated road building and, therefore, all would increase motorized recreation activities and limit primitive recreation activities more than Alternative 2.

## **VCU 427/428 - Keku Strait/Rocky Pass**

No logging is planned under the current land use designation and, therefore, the area would continue to provide primitive experiences.

## **Visual Resources**

The potential for visual impact is greatest right after timber is harvested. In the foreground (up to 1/2 mile), stumps and debris are dominant. Activities associated with road construction, such as cut and fill slopes, rock pits, and turn outs would be readily visible to the observer. As seen in the middleground (1/2 mile to 2 miles), vivid distinction in texture of the mature stand and the harvest unit would be apparent. Exposed boles and limbs of the adjacent stand would dominate the visual setting.

By the fifth year of regeneration, the stand would be filling out with low vegetation (berry bushes, ferns, etc.). In some cases, young alder would be present where excessive disturbance occurred. In the foreground, the visual effects of the clearcut would still be evident, but shrubby vegetation and young trees would begin to cover over the stumps and exposed ground. In the middleground, the harvest unit would remain evident, with sharp contrasts in color and texture.

From year five to twenty, the young trees would establish themselves, reaching a height of approximately 19 feet. In the foreground, at the end of twenty years, the forest visitor would see healthy, thinned stand of spruce and hemlock, with some yellow cedar. If views had been created with the original clear cut, they would become limited. The pre-commercial thinning process would create a well defined stand. In the middleground, the contrast between the harvest unit and the mature forest would be very obvious.

At the end of fifty years, the stand would reach a height of approximately 50 to 70 feet. As seen in the middleground, this stand would be approximately half the height of existing mature stands, providing a smooth visual transition at the harvest unit boundary. Should new harvest occur adjacent to the 50-year stand, the effect would be an even less obvious transi-

tion. In the foreground, the growth of the stand would limit views beyond the original unit. At the end of fifty years, the canopy would be closing and the stand would appear very dense.

Towards the end of eighty years, the stand would reach 75 percent of its mature height. From the middleground there would be less distinction between this stand and adjacent mature stands. The canopy would appear full with crowns touching, allowing little sunlight to reach the forest floor and little understory vegetation to establish. As seen in the foreground, tree boles of 23-inch diameter would be visibly dominate from the road and the canopy would be visible at approximately thirty feet from the forest floor. Roadside vegetation would include ferns and berries.

At 100 years, little difference would be noticed between the 100-year stand and an adjacent mature stand. Timber would reach approximately 100 feet and appear healthy and lush with a full canopy. In the foreground, the stand would be extremely dense, with little light reaching the forest floor. Selective harvest or small group selection may be necessary adjacent to recreation roads to allow additional sunlight, for safety purposes, or to increase vista opportunities. In the middleground, the color and texture of the mature stand would allow distinction between it and adjacent mature stands, which display a scattering of dead tops and a generally more irregular tree growth pattern.

A description of the visual condition of each VCU by the year 2011 under the continued implementation of TLMP and the long term APC contract follows:

### **VCU 398 - Keku Island**

If the Forest Plan were fully implemented, harvest activities may be visible from Keku Straits. The landscape would not be dominated by harvest activities, considering the broken, irregular topography of the area. None of the action alternatives propose harvest in this VCU, and there is no development planned through the termination of the long term contract (2011).

### **VCU 399 - Saginaw Bay**

Past, present and future logging activities would result in a landscape dominated by openings of various ages, design characteristics and sizes. The Saginaw Bay area has been extensively logged over the years and its appearance reflects the intensity of these activities. The area is visibly regenerating with past activities in the 5 to 20 year age class. All the action alternatives propose the same harvest units. In light of the extent of past harvest activities, these proposed units will have little impact on the cumulative effects of VCU 399.

### **VCU 400 - Security Bay**

The east side of Security Bay exists in a highly modified condition, and will continue to appear so until the year 2011. Harvest units are in various stages of regeneration, with some harvested 5 years ago and earlier. Alternative 2 would develop the west side of Security Bay, which will hasten the managed appearance of this VCU. The apparent size of harvest activities would be minimized through sensitive design, spacing and location of these activities. The remaining action alternatives do not propose road construction or harvest on the west side of the bay, maintaining the natural integrity of this area.

### **VCU 402 - Rowan Bay**

Upon entering Rowan Bay, the traveller currently encounters a landscape heavily altered by timber harvest activities. Patterns established through clearcutting dominate the visual setting, and would continue to do so through 2011. Harvest activities proposed in all SEIS action alternatives are the same, and would continue the advancement of the forest to a highly managed condition.



## **VCU 403 - Bay of Pillars**

This VCU would be maintained in its current visual condition. The existing road would be maintained, and the adjacent landscapes would be allowed to evolve naturally.

## **VCU 405 - Aleck's Lake**

The road proposed in Alternative 3 would not visually affect the wilderness recreation experience as seen from Aleck's Lake. Existing vegetation screens the road from sight, which is located in an area of low lying topography. Alternatives 2, 4 and 5 do not propose any development in this VCU, allowing it evolve naturally.

## **VCU 416 - Alvin Bay**

The landscape character of Alvin and Reid Bays would naturally evolve. There are no harvest activities proposed for this area in any of the action alternatives.

## **VCU 417 - No Name Bay**

Alternatives 1, 2, 4 and 5 do not propose harvest activities, and would therefore maintain this area in its current visual condition. Alternative 3 proposes harvest units and road construction on the south side of No Name Bay, and would advance the forest to a visually managed condition.

## **VCU 418 - Seclusion Harbor**

As seen from Seclusion Harbor the landscape would appear in its natural condition. In Alternative 3, landforms seen from the Salt Lagoon would appear heavily modified by timber harvest activities. Alternatives 1, 2, 4 and 5 would allow the area to evolve naturally.

## **VCU 419 - Threemile Arm**

Three Mile Arm appears to be highly modified by timber harvest and road construction activities. The eastern portion of the VCU, proposed for harvest in Alternative 5, would further extend the existing road system, and allow the advancement of the forest to a highly managed condition.

## **VCU 420 - Port Camden**

All action alternatives propose identical harvest units located on the west side of Port Camden. These units would begin a gradual evolution to a managed condition. The east side of Port Camden would evolve naturally.

## **VCU 421 - Kadake Bay**

The visual character of areas seen from Kadake Bay would be maintained in their current condition. Harvest activities are identical in all action alternatives and would be located in areas not seen from the bay or USFS recreation cabin. Areas of extended rotations would minimize visual impacts.

## **VCU 427/428 - Keku Strait/Rocky Pass**

These VCUs would be maintained in their natural condition in all alternatives. The landscape would be allowed to evolve naturally.

## Cultural Resources

Impacts from natural decay, landscape changes, private developments, and timber management activities have combined to destroy or disturb a portion of the cultural resources of Southeast Alaska. Development activities of all kinds pose particular threats to cultural resources because they tend to be located in the same places that cultural resources are found, such as sheltered coastal settings. In addition, areas where landowners have clearcut large blocks of land or plan an accelerated period of timber harvest are also of concern.

Because little inventory has taken place in the area, it is impossible to determine the exact nature and number of resources that have been lost. Mitigation measures have only been implemented during recent years. The existing cultural resource compliance review process incorporates a consideration of cumulative effects for proposed actions on National Forest land. Future timber management activities could combine with other ground-disturbance to result in continued loss of cultural resources. The implementation of various mitigation measures would reduce this loss by preserving significant sites and by providing data on those that cannot be preserved, even though the loss of a cultural resource site cannot be completely compensated.

## ANILCA Section 810 Subsistence Evaluation

Section 810 of the Alaska National Interest Lands Conservation Act (ANILCA) requires a Federal agency, having jurisdiction over lands in Alaska, to evaluate the potential effects of proposed land-use activities on subsistence uses and needs. Section 810 of ANILCA states:

In determining whether to withdraw, reserve, lease, or otherwise permit the use, occupancy, or disposition of public lands under any provision of law authorizing such actions, the head of the agency having primary disposition over such lands or his designee shall evaluate the effect of such use, occupancy, or disposition on subsistence uses and needs, the availability of other lands for purposes sought to be achieved, and other alternatives which would reduce or eliminate the use, occupancy, or disposition of public lands needed for subsistence purposes. No such withdrawal, reservation, lease, permit, or other use, occupancy or disposition of such lands which would significantly restrict subsistence uses shall be effected until the head of such federal agency

1. gives notice to the appropriate state agency and appropriate local committees and regional councils established pursuant to ANILCA Section 805;
2. gives notice of, and holds, a hearing in the vicinity of the area involved; and
3. determines that (A) such a significant restriction of subsistence uses is necessary, consistent with sound management principles for the utilization of the public lands; (B) the proposed activity will involve the minimal amount of public lands necessary to accomplish the purposes of such use, occupancy, or other disposition; and (C) reasonable steps will be taken to minimize adverse impacts upon subsistence uses and resources resulting from such action.

As noted in Chapter 3, the 1981-86 Record of Decision (ROD) preceded the passage of ANILCA. The Federal District Court, in *Tenakee Springs v. Courtright*, did not decide if the Forest Service complied with Section 810. To ensure that the 1981-86 and 1986-90 Records of Decision do comply with ANILCA, the Forest Service further evaluated the potential effects to subsistence uses resulting from the proposed actions considered in the Supplemental EIS.

Since ANILCA, two subsistence evaluations have been made for Analysis Area 12, for the 1986-90 ROD. Both evaluations concluded that the proposed actions would have no or only minor potential impact to subsistence users of Kuiu Island. In *Hanlon v. Barton*, however, the Federal District Court concluded that the Forest Service must consider the cumulative impacts to subsistence resources and subsistence users of past, proposed, and reasonably fore-



*Traditional Basket Weaving  
by Native Residents*



seeable future activities in conducting an ANILCA Section 810 Subsistence Evaluation. Further, the Court noted that actions need not be connected to be considered as cumulative effects.

Chapter 3, displays the current and historical subsistence uses on Kuiu Island (Analysis Area 12), by the rural communities of Kake, Port Alexander, Point Baker, Port Protection, Petersburg, and Wrangell.

This section, evaluates how the proposed action alternatives in Analysis Area 12 could affect subsistence resources used by the above communities. The subsistence resource categories evaluated are fish, timber, wildlife, and other foods such as berries and kelp. Effects of the proposed alternatives are evaluated by: (1) changes in abundance or distribution of subsistence resources, (2) changes in access to subsistence resources, and (3) changes in competition from non-subsistence users for those resources. The Evaluation determines whether subsistence uses in Analysis Area 12 or portions of Analysis Area 12 would be significantly restricted by any of the proposed action alternatives. To determine this, the evaluation: (1) considers the availability of subsistence resources in the surrounding areas; (2) considers the cumulative impacts of past and foreseeable future activities on subsistence users and resources; (3) looks at potential cultural and social implications affecting subsistence users; (4) and focuses on the mapped important-subsistence-use areas in Analysis Area 12. (Important Subsistence Area Use Map, in Map Packet.)

The evaluation relies heavily upon the use of wildlife habitat capability models as well as upon ADF&G hunter survey data. (See Consolidated Appendix, Volume II, C-3 for discussion of Data Adequacy and Models Used.)

## DEIS Evaluation

The DEIS Subsistence Evaluation for Analysis Area 12 focused on the rural communities that intensively use the area for subsistence purposes. The Evaluation projected the potential effects on access to subsistence resources such as fish, wildlife, other subsistence foods, and timber. The intent of the evaluation was to find whether any proposed alternative “may” significantly restrict subsistence use in the Analysis Area. The Findings determined: (1) the proposed alternatives would have no or only minor effect on subsistence users for each of the categories evaluated; (2) the foreseeable timber harvest schedule prescribed in the Tongass Land Management Plan poses enough potential for affecting subsistence uses to substantiate a finding of “may” restrict subsistence use of wildlife. Based on the DEIS Findings and the Federal District Court’s Finding in *Hanlon v. Barton*, Subsistence Hearings were scheduled.

Phase I of the DEIS broadly addressed the availability of other lands suitable for the purpose of the Supplemental EIS. (See discussion in Chapter 2, Areas Eliminated from Detailed Study 1981-86 EIS and Alternatives Eliminated from Detailed Study in 1986-90 EIS.)

The range of alternatives in Phase II of the DEIS, for Analysis Area 12, displayed sensitivity for reducing or eliminating proposed actions on subsistence-use lands. This sensitivity has been carried forward into the FEIS for Analysis Area 12.

## Hearings

Hearings and open houses were announced in a letter accompanying the DEIS, mailed June 9, 1989. Letters were sent to the Alaska Department of Fish and Game, Regional Fish and Game Advisory Councils, Local Fish and Game Advisory Committees, and to each Post Office in the eleven communities where Hearings were to be held. Announcements were made in newspapers and on radio stations in the Kuiu Island vicinity.

An administrative oversight necessitated re-scheduling the Hearings from July 10-14 to August 10-12. In late-June, another letter was sent to all people on the EIS mailing list. The letter announcing the Hearings also furnished the following information: testimony at the Hear-



ing could be either verbal or written; people unable to attend could have another person submit their written testimony at the Hearing; people could send written testimony to the SEIS Team if postmarked on or before the date of the Hearing in the community the testimony was given.

An open house, beginning at 2:00 pm, preceded each Hearing. People were invited to review information presented in the Draft Supplemental EISs and to ask questions of the planning staff who prepared the documents. Information displayed at the Open House included maps which displayed harvest units and roads being proposed by each Alternative. Harvest units thought to be of particular concern to the Hearing community, were highlighted on the maps displayed. The identification of units of possible concern was based upon TRUCS inventory data.

Hearings and open houses scheduled in the vicinity of Analysis Area 12 included:

Point Baker/Port Protection Aug. 10, 1989 7:00pm Point Baker/Community Hall

Port Alexander Aug. 11, 1989 7:00pm Port Alexander Community Hall

Kake Aug. 12, 1989 7:00pm Kake High School

Petersburg Aug. 11, 1989 7:00pm Stikine Forest Supv. Office

Wrangell Aug. 10, 1989 7:00pm Catholic Parish Hall

On August 10, 1989, Hearings were held at Point Baker and Wrangell. At Point Baker, nine people attended the Hearing; six people gave verbal testimony; eleven pieces of written testimony were accepted by the Hearing Officer. Two additional written comments were received pertaining to the Hearing at Point Baker. At Wrangell, eight people attended the Hearing; one person gave verbal testimony; one piece of written testimony was accepted by the Hearing Officer.

On August 11, 1989, hearings were held at Port Alexander and Petersburg. At Port Alexander, four people attended the Hearing and all gave verbal testimony. No written testimony was received by the Hearing Officer. At Petersburg, eight people attended the hearing and one person gave verbal testimony. No written testimony was received by the Hearing Officer.

On August 12, 1989, a hearing was held at Kake. Nine people attended the hearing and all presented verbal testimony. No written testimony was received by the Hearing Officer.

The hearing transcript of the proceedings for each community can be found in Consolidated Appendix, Volume I.

The verbal and written testimony received at the Hearings provided important additional information pertinent to the Subsistence Evaluation for the FEIS in Analysis Area 12.

## FEIS Findings

Using the information gathered from the Hearings and written public comments, the FEIS subsistence evaluation considers, with distinct Findings by alternative and by resource category, whether or not there is a significant possibility of a significant restriction of subsistence use. Again, the resource categories evaluated are fish, wildlife, other foods, and timber. As indicated earlier, the evaluation considers the effects by alternative on (1) access, (2) abundance or distribution, (3) and competition for each resource category.

The Alaska Land Use Council's definition of "significantly restrict subsistence use" is one guideline used in the Findings. By this definition:

A proposed action shall be considered to significantly restrict subsistence uses, if after any modification warranted by consideration of alternatives, conditions, or stipulations, it can be expected to result in a substantial reduction in the opportunity to continue sub-

sistence uses of renewable resources. Reductions in the opportunity to continue subsistence uses generally are caused by: reductions in abundance of, or major redistribution of resources; substantial interference with access; or major increases in the use of those resources by nonrural residents. The responsible line officer must be sensitive to localized, individual restrictions created by any action and make his/her decision after a reasonable analysis of the information available.

The U.S. District Court Decision of Record in *Kunaknana v. Watt* provided additional definitions of “significant restriction of subsistence uses” and are also used as guidelines in the Findings. The definitions from *Kunaknana v. Watt* are:

Significant restrictions are differentiated from insignificant restrictions by a process assessing whether the action undertaken shall have no or slight effect as opposed to large or substantial effects. In further explanation the Director (BLM) states that no significant restriction results when there would be “no or slight” reduction in the abundance of harvestable resources and no occasional redistribution of these resources. There would be no effect (slight inconvenience) on the ability of harvesters to reach and use active subsistence harvesting sites; and there would be no substantial increase in competition for harvestable resources (that is, no substantial increase in hunting by non-rural residents).

Conversely, restrictions for subsistence uses would be significant if there were large reductions in abundance or major redistribution of these resources, substantial interference with harvestable access to active subsistence-use sites or major increases in....non-rural resident hunting.

In light of this definition the determination (finding) of significant restriction must be made on a reasonable basis, since it must be decided in light of the total subsistence lands and resources that are available to individuals in surrounding areas living a subsistence lifestyle.

The FEIS evaluates the availability of subsistence resources in surrounding areas that could be accessed without undue risk or economic hardship to subsistence users.

Chapter 3 concluded that all the VCUs in Analysis Area 12 are used for harvest of subsistence resources. However, specific areas within these VCUs have been identified as being important for harvesting subsistence resources (Important Subsistence Use Area Map). Some proposed timber harvest units are within mapped important-subsistence-use areas. Table 4-37 lists these harvest units by alternative. The locations of the proposed units, found in the alternative maps, are considered in the evaluation and the Findings.

Due to the number of proposed timber harvest units located within mapped important subsistence-use areas the FEIS re-evaluates the use of other available lands. Phase I of the Supplemental FEIS addressed the need to harvest timber from Analysis Area 12. Within Analysis Area 12, other areas are theoretically available for timber harvest, however two related factors render it impractical to use them. The first factor involves the logistics of providing timber to Alaska Pulp Corporation to meet contract obligations for the remainder of the 1986-90 Operating Period and providing a smooth transition to the next operating period. This requires the Forest Service to avoid alternatives needing extensive road construction or new log transfer facilities involving new or additional permits. The second factor involves protecting watersheds by distributing timber harvest geographically through time. In several watersheds, the amount of timber harvest in the first entry has approached the threshold of concern (see Soil and Watershed sections). Although these watersheds are available for additional timber harvest, it is better to defer additional harvest until the ecosystem in these previously harvested areas has had sufficient time to recover.

Table 4-37

## Scheduled Timber Harvest in Important Subsistence Use Areas (Unit Numbers)<sup>1</sup>

Alternatives			
2	3	4	5
400-14	417-8	402-9	402-9
400-15	417-10	420-7	419-12
400-16	417-12	420-11	419-13
400-19	417-13	420-13	419-14
400-21	417-14	420-14	419-15
400-24	417-15	421-6	419-16
420-7	417-16	421-7	419-17
420-10	417-20		419-18
420-11	417-21		419-19
420-13	418-1		419-20
420-14	418-2		419-21
	418-5		420-7
	418-6		420-11
	420-7		420-13
	420-11		420-14
	420-13		421-6
	420-14		421-7
	421-6		
	421-7		

SOURCE: SEIS Planning Record.

NOTE: Refer to alternate maps and the Importance Subsistence Use Area map folded at the back of this document.

<sup>1</sup> Unit numbers are shown by VCU then harvest unit number within that VCU. For example, 400-14 is harvest unit 14 in VCU 400.

## Wildlife Findings

The rural communities in the vicinity of Analysis Area 12 harvest a variety of wildlife resources. The 1987 Tongass Resource Use Cooperative Study found that wildlife made up 15 to 39 percent of the per-capita harvest of principal subsistence resources used by the rural communities in the vicinity of Analysis Area 12. The pounds per capita ranged from 46 in Port Protection to 128 in Point Baker.

### Abundance or Redistribution

#### Deer

Deer are an important subsistence resource used by the rural communities in the vicinity of Analysis Area 12. The 1987 Tongass Resource Use Cooperative Study indicates deer provide about 13 to 37 percent of the per-capita harvest of principal subsistence resources harvested by subsistence users of Analysis Area 12. The per-capita harvest of deer ranged from 21 pounds by Wrangell residents to 92 pounds by Point Baker residents.

The Alaska Department of Fish and Game (ADF&G) 1987 Hunter Survey asked hunters how many deer were needed to harvest for a season to be considered successful and how many deer were desired to harvest (Table 4-38). As noted in Chapter 3, the Game Board has not al-



lowed deer hunting on Kuiu Island since 1976. In recent years no deer hunting has been documented on the Island. This suggests that subsistence users who have traditionally harvested deer on Kuiu Island are harvesting deer from surrounding subsistence-use areas.

Successful season was based on responses to the question: What is your idea of a successful deer season? (ADF&G 1987 Hunter Survey.)

Desired deer/hunter was based on responses to the question: What is the number of deer you would like to harvest each year? (ADF&G 1987 Hunter Survey.)

Thirty-six proposed timber harvest units being considered in various alternatives are located in the mapped important-deer-subsistence-use areas. The projected effects to deer resulting from harvesting these units are evaluated in the Wildlife section. They are evaluated even though the deer population on Kuiu Island is currently below a huntable level. The projected effects on habitat capability by VCU range from no effect to a maximum of a 7.5 percent reduction. When the effect is aggregated to the ADF&G Minor Harvest Area, the maximum deer habitat capability reduction is less than 2 percent and when the effect is added to the cumulative effects from past timber harvest activities, the maximum reduction in habitat capability is less than 11 percent (Table 4-13). It is projected that 87 percent habitat capability would still remain when the project foreseeable-future effects on deer habitat are realized (Figure 4-4). Thus, if the deer population were at a huntable level, the projected effects on abundance by the proposed activity would be minor. Changes in local deer herd distribution are also expected to be minor although the past and proposed timber harvest and the foreseeable effects of twenty-five-year-plus second growth in these harvest units have and will alter deer-use patterns.

#### Furbearers

Some trapping presently occurs in Analysis Area 12, indicated by the harvest of furbearers in Alaska Department of Fish and Game Minor Harvest Areas (MHA) on Kuiu Island (Tables 3-15 and 3-17). Four proposed timber harvest units in various alternatives are located in mapped important-furbearer-subsistence-use areas in Port Camden (VCU 420). Although the trapping areas are few, they are important to the rural communities using Analysis Area 12.

4-38

#### Hunter Desires for Deer by Subsistence Community<sup>1</sup>

Community	Number Of Hunters	Deer Per Hunter For Successful Season <sup>3</sup>		
		Actual <sup>2</sup>		Desired <sup>4</sup>
Kake	75	2.2	3.4	7.0
Point Baker	18	2.7	2.8	3.1
Port Alexander	22	4.7	4.4	7.4
Port Protection	11	0.8	3.3	3.8
Petersburg	665	2.2	2.7	3.9
Wrangell	463	0.7	1.9	3.7

SOURCE: ADF&G 1987 Hunter Survey

<sup>1</sup> Subsistence Communities include those communities whose residents use the APC Sale Area for subsistence.

<sup>2</sup> Actual number of deer harvested per hunter in 1987.

<sup>3</sup> Number of deer per hunter needed for successful season was based on responses to the question; What is your idea of a successful deer season?

<sup>4</sup> Number of deer per hunter desired was based on responses to the question; What is the number of deer you would like to harvest each year?

# 4 Environmental Consequences

## *Subsistence Hunting*



Past timber harvest and road construction activities in ADF&G Minor Harvest Area 2012 within Analysis Area 12, have resulted in a projected reduction of pine marten habitat capability from 459 pine marten in 1961 to 109 today. This represents a 76 percent projected reduction. Most of the activities, however, occurred outside of the mapped important furbearer subsistence use areas in Minor Harvest Area 2012. The potential project and reasonably foreseeable project effects on pine marten habitat capability in Minor Harvest Area 2012, are projected to be less than 1 percent. The potential effects would not significantly add to the past cumulative effects in this Minor Harvest Area. Proposed project and foreseeable future effects on pine marten habitat capability in Minor Harvest Areas 2013 and 2014 are projected to range from no effect to less than a 8 percent reduction (Table 4-15 and Figure 4-6).

The analysis in the Wildlife section, projected effect on furbearer abundance in the mapped important-furbearer subsistence-use area in VCU 420 and in the remainder of Analysis Area 12 is minor. Changes in local furbearer distribution are also projected to be minimal although the foreseeable effects of twenty-five-year-plus second growth include altering furbearer habitat-use patterns.

### **Waterfowl**

A variety of waterfowl from Saginaw Bay, Security Bay, Kadake Bay, Port Camden, Three Mile Arm, No Name Bay, Rocky Pass, Rowan Bay, and Bay of Pillars are harvested by the rural communities using Analysis Area 12. Hearing testimony affirmed the importance of these areas for harvesting waterfowl.

The wildlife section concluded the proposed alternatives would have a minimal effect on wetland habitat. Therefore, waterfowl abundance and distribution would likely remain unchanged.

### **Black Bear**

Chapter 3 noted that Kuiu Island is a prized area for black bear hunting. Table 3-14 shows black bear harvest has increased since 1981, especially by nonresident hunters. People who testified at the Hearing in Point Baker attested to the importance of No Name Bay, Seclusion



Harbor, and Three Mile Arm for black bear harvest. Although no analysis was done to evaluate the proposed site-specific effects on black bear habitat capability, impact would be minimal. This judgment is based on the limited proposed timber harvest in key black bear habitats such as streamside riparian and beach fringe habitat (Tables 4-10, 4-11, and 4-12). The effect on black bear abundance and distribution would also be minimal.

### Access

Access to historic subsistence-use areas has not been affected by past land-use activities and will not be affected by any of the proposed alternatives. Nor is there any projected effects in the foreseeable future due to activities proposed in this project. This is because traditional access by boat or float plane would remain the same.

Roads radiating from the logging community of Rowan Bay provide a means of access to the northern half of Kuiu Island. These roads provide access to areas that were not previously used for harvesting subsistence wildlife resources. The road construction associated with the proposed timber harvest alternatives would increase access into areas not traditionally used as subsistence harvest areas (see the Alternative Maps). Other rural communities besides Rowan Bay could benefit from the increased access if cars and pickups could be transported efficiently to Kuiu Island. Presently, the only way to do this is by boat or barge. The Alaska Marine Highway System does not serve Rowan Bay and there is no indication it will do so in the foreseeable future.

Alternative 3 of the DEIS, states the proposed log transfer facility at No Name Bay (VCU 417) could impact the anchorage normally used by subsistence users from Point Baker and Port Protection. In response to the possible loss of this anchorage site, either a public float or mooring sites (boom logs positioned by anchors or pilings) would be constructed on the southwest side of the present anchorage. At the Subsistence Hearing in Point Baker on August 10, 1989, the Sumner Strait Fish and Game Advisory Council Chairperson and eight other citizens presented verbal and written testimony opposing Alternative 3. One reason given was the potential effects on the anchorage site at No Name Bay. People testifying felt the suggested public float or mooring sites would not offset the loss of this valuable anchorage site. After considering these concerns, the Forest Service maintains that either a public float or mooring sites would mitigate the loss of the anchorage site.

### Competition

A substantial increase in competition for subsistence wildlife resources from non-rural community residents is not projected to result from the alternatives proposed in the FEIS. Nor is competition for those wildlife resources projected to increase in the foreseeable future due to activities proposed in this project. This is because the opportunity for easy and economical access to Kuiu Island by non-rural community residents is assumed to remain limited during the life of the proposed project.

Black bear is the only known wildlife resource currently being harvested in Analysis Area 12 by non-rural community residents. Since 1980, nonresident hunters, guided by outfitters, have taken 65 percent of the black bear harvest on Kuiu Island (Table 3-14). There are no documented connections between the increase in nonresident black bear harvest and the land management activities in Analysis Area 12. Some black bears are thought to be harvested by Alaska nonresident hunters employed at Rowan Bay. There were no direct comments in the Hearing testimony to indicate that competition for black bear by the Alaska nonresident hunters and non-rural residents is affecting the ability of rural community residents to harvest black bear.

Hearing testimony from Kake indicates that Rowan Bay residents are harvesting waterfowl. They may also be harvesting furbearers. It is likely some waterfowl and furbearers are being harvested by residents of Rowan Bay who are not yet qualified as Alaska residents or who are rural community residents seasonally employed at Rowan Bay.



People who testified at the Point Baker and Kake Hearings expressed concern that increased competition from loggers for subsistence wildlife resources would affect their ability to harvest those resources. Point Baker and Port Protection testimony focused on Alternative 3 which proposed to construct a log transfer facility, logging camp, and a log-chipping facility at No Name Bay. Kake testimony focused on Security Bay where timber harvest is proposed in Alternatives 2, 3, 4, and 5.

Some residents of Rowan Bay have met residency requirements and do qualify as subsistence users. Residents of the logging camp proposed for No Name Bay in Alternative 3 would qualify as subsistence users if they met residency requirements. The new camp would be considered a rural community under current State law if it were occupied year-round.

The Forest Service is sensitive to the concerns expressed in the testimony. There may be some increased competition for subsistence wildlife resources from Alaska nonresidents and non-rural residents employed at Rowan Bay or similarly employed at the proposed logging camp at No Name Bay. However, this possible increase in competition is not projected to be substantial because of the small number of people involved.

## Finding

Based on the data and models used, the FEIS concludes the actions proposed in Alternatives 1 through 5 would not cause a significant possibility of a significant restriction of subsistence use of wildlife in Analysis Area 12. (See Consolidated Appendix, Volume II, C-3: Data Adequacy and Models Used.) The Finding is based on projected resource effects by the three evaluation categories shown in Table 4-39. "Yes" indicates a significant possibility of a substantial effect and "no" indicates an insignificant possibility of a substantial effect.

## Fish and Shellfish Findings

Fish and shellfish are an important subsistence resource used by the rural communities in the vicinity of Analysis Area 12. The 1987 Tongass Resource Use Cooperative Study indicated fish and shellfish made up 43 to 80 percent of the per-capita harvest of principal subsistence resources harvested by subsistence users of Analysis Area 12. The pounds per capita ranged from 84 in Kake to 249 in Port Protection.

One proposed harvest unit is in the mapped important-salmon-subsistence-use areas.

Table 4-39

### Significant Possibility of a Significant Restriction of Subsistence Use of Wildlife Resources<sup>1</sup>

	Alternatives				
	1	2	3	4	5
Abundance or Distribution	no	no	no	no	no
Access	no	no	no	no	no
Competition	no	no	no	no	no

<sup>1</sup> "No" indicates an insignificant possibility of a substantial effect.

## Abundance and Distribution

### Salmon

People who testified at Kake emphasized the importance of the streams flowing into Security Bay, especially a particular stream with a late-fall chum salmon run. Kake residents have traditionally depended on this stream for their fall chum. They are concerned that the proposed road crossings at the head of Security Bay near Salt Chuck Lake, along with other proposed road construction and timber harvest in the Security Bay area might impact this traditionally and culturally important fall chum salmon run. People testified they have seen streams die in other clearcut areas including clearcuts on their own Native lands. One person testified, "And several years ago in Saginaw Bay where the logging company was, threw some dynamite into the streams and just literally killed thousands of fish. Last year-September at Kadake Bay there was a bunch of us fishing at Port Camden and here comes about ten thousand of humpies all at one time coming out of the bay there, dead." There is a belief that logging is killing fish stocks. A suggestion was made to leave bigger buffers along streams.

During the Point Baker Hearing, a concern was expressed about the potential effects of proposed activities in Alternative 3 on pink and chum salmon spawning habitat in the No Name Bay area.

The FEIS projects the potential effects from the proposed actions on salmon spawning and rearing habitat would be minimal or eliminated by applying the Forest Service standards, guidelines, and prescriptions, described in detail in the Aquatic Habitat Management Handbook. All proposed timber harvest units near salmon spawning and rearing streams are protected by buffers of at least 100 feet except for one cutting unit in VCU 417 and one cutting unit in VCU 419 (Alternative Maps). In those two proposed units there will be a 50-foot buffer. The effects from the proposed actions for the foreseeable future are also projected to be minor. Thus, the effect on the abundance and distribution of the salmon harvest for subsistence uses in Analysis Area 12 would be negligible.

*Drying Herring Roe at  
Killisnoo, Early 1900s*





### Other Finfish

The action alternatives for the proposed project are projected to have no impact and no foreseeable future impact on other finfish habitat. Therefore, the abundance and distribution of those other finfish would not be affected.

### Shellfish

The FEIS projects no measurable effects due to Alternatives proposing timber harvest, road construction, and construction of a log transfer facility on habitat for crabs, clams, and other shellfish. The construction of a log transfer facility at No Name Bay, proposed in Alternative 3, would affect slightly over 3 acres of marine habitat. The effect on the abundance and distribution of local crabs, clams, and other shellfish is projected to be negligible. The project effects for the foreseeable future are also projected to be negligible.

### Access

See previous discussion of access for wildlife.

### Competition

The DEIS concluded the construction of a log transfer facility and logging camp at No Name Bay could affect subsistence uses by Point Baker and Port Protection residents. The effects were projected to come from potential increased competition of logging camp residents for crabs, clams, and other shellfish. Testimony from the Hearing at Point Baker and Port Protection reaffirmed competition would be a concern. The probability of competition increased because the proposed logging camp would contain only a bunkhouse used for intermittent timber harvest and road construction activities in the area. Rowan Bay would continue to be the primary base camp through the life of the project. The probability of unlimited access to boats for harvesting crabs, clams, and other shellfish in the No Name Bay area by logging company employees from Rowan Bay is also small.

Kake residents testified that people from Rowan Bay have fished cohos from reaches along existing roads in the Security Bay drainage (VCU 400). They expressed concern about the depletion of these coho stocks due to harvesting by Rowan Bay residents.

The FEIS assumes some residents of Rowan Bay have met residency requirements and do qualify as subsistence users. As indicated in the discussion concerning competition for wildlife, there may be some increased competition for subsistence fish resources from Alaska non-residents and non-rural residents employed at Rowan Bay or from the proposed logging camp at No Name Bay. However, this increase would not be substantial. due to the small number of people involved.

### Finding

Based on the data and models used, the FEIS concludes the actions proposed in Alternatives 1 through 5 would not cause a significant possibility of a significant restriction of subsistence use of fish and shellfish in Analysis Area 12. (See Consolidated Appendix, Volume II, C-3: Data Adequacy and Models Used.) The Finding is based on projected resource effects by the three evaluation categories shown in Table 4-40. "Yes" indicates a significant possibility of a substantial effect and "no" indicates an insignificant possibility of a substantial effect.

## Other Foods

Information and data from the Tongass Resource Use Cooperative Study (TRUCS) and the Subsistence Hearings have provided additional information concerning the gathering of other foods by rural communities using Analysis Area 12. Other foods include plants such as kelp, goose tongue, a variety of berries, etc. Though other foods did not constitute a major portion of the 1987 subsistence harvest by the rural communities documented in TRUCS, they are considered subsistence resources. The TRUCS indicated plants made up 1.4 to 7.5 percent of the per-capita harvest of principal subsistence resources harvested by subsistence users of Analysis Area 12. The pounds per capita ranged from 2.3 in Wrangell to 23 in Port Alexander.



Table 4-40  
**Significant Possibility of a Significant Restriction of Subsistence Use of Fish Resources<sup>1</sup>**

	Alternatives				
	1	2	3	4	5
Abundance or Distribution	no	no	no	no	no
Access	no	no	no	no	no
Competition	no	no	no	no	no

<sup>1</sup> "No" indicates an insignificant possibility of a substantial effect.

**Abundance and Distribution**

Most traditional gathering of other foods occurs near beach and estuarine areas. Except for the log transfer facility proposed in Alternative 3, no activities proposed in the alternatives would infringe upon the beach and estuarine areas. The proposed timber harvest activity would improve the availability of berries in the short-term. Based on a projected increase of berries and the locations of the potential activities, short term and reasonably foreseeable effects of the proposed action alternatives on abundance and distribution would be minimal.

**Access**

See previous discussion of access for wildlife.

*Gathering One of a Variety of Food Items from the Forest*



## Competition

People who testified at the Point Baker Hearing expressed concern that increased competition from loggers for other foods would affect their ability to harvest those subsistence resources. Point Baker and Port Protection testimony focused on Alternative 3 which proposed to construct a log transfer facility, logging camp, and a log-chipping facility at No Name Bay.

Some residents of Rowan Bay have met residency requirements and do qualify as subsistence users. Residents of the logging camp proposed for No Name Bay in Alternative 3 would qualify as subsistence users if they met residency requirements. The new camp would be considered a rural community under current State law if it were occupied year-round.

As indicated in the discussion concerning competition for wildlife, there may be some increased competition for subsistence other food resources from Alaska nonresidents and non-rural residents employed at Rowan Bay or from the proposed logging camp at No Name Bay. However, this increase would not be substantial, due to the few number of people involved.

## Finding

Based on the data and models used, the FEIS concludes the actions proposed in Alternatives 1 through 5 would not cause a significant possibility of a significant restriction of subsistence use of other food resources in Analysis Area 12. (see Consolidated Appendix, Volume II, C-3: Data Adequacy and Models Used.) The Finding is based on the potential resource effects by the three evaluation categories shown in Table 4-41. "Yes" indicates a significant possibility of a substantial effect and "no" indicates an insignificant possibility of a substantial effect.

## Marine Mammals

Federal law prohibits the taking of marine mammals by anyone other than Native hunters. There is no evidence that timber harvest activities have any effects on marine mammals. Therefore, there would be no possibility of a significant restriction in subsistence use of marine mammals by the rural communities surrounding Analysis Area 12.

## Timber

The Forest Service personal free use policies in Alaska for firewood and timber remain unchanged from the 1986-90 Operating Period EIS for the APC Long-Term Sale. Since the Forest Service policy is still in effect, the proposed alternatives for Analysis Area 12 will have no effect on the availability of firewood and personal use timber.

Table 4-41

### Significant Possibility of a Significant Restriction of Subsistence Use of Other Food Resources<sup>1</sup>

	Alternatives				
	1	2	3	4	5
Abundance or Distribution	no	no	no	no	no
Access	no	no	no	no	no
Competition	no	no	no	no	no

<sup>1</sup> "No" indicates an insignificant possibility of a substantial effect.



## Mitigation

Mitigation measures that protect or enhance fish and game resources will also protect and enhance subsistence activities because most subsistence use involves the harvesting of fish and game. Mitigation measures are built into each of the action alternatives considered in this SEIS. These specific measures are detailed on the unit cards in Appendix A-1 and also at the end of this chapter in the mitigation section, and are briefly summarized here.

Perhaps the most significant subsistence resource in Analysis Area 12 is the salmon. Fish habitat is protected in each alternative through the application of AHMU prescriptions along every Class I and II stream. A 100 foot buffer would be left along both sides of every stream except two. The two exceptions are for lake-like channels where a 50 foot buffer will adequately protect fish habitat. AHMU prescriptions, in addition to protecting fish habitat, also protect riparian habitat important to other species such as deer, black bear, and furbearers.

Deer harvesting is not currently permitted in Analysis Area 12, but it could be in the future. Mitigation to enhance deer habitat in second growth stands following timber harvest includes thinning to a wider than normal spacing and pruning. Both of these are designed to improve forage. Thinning to a wider standard has been successfully employed in Southeast Alaska. Pruning, which has been effective elsewhere, has not been tried in Southeast Alaska.

Another form of mitigation, which is built into the design of the alternatives, is the location of the harvest units. Harvest units are intentionally located away from important fish and old growth habitat, to the extent practicable, to reduce effects on these habitats. The proximity to prior harvest units is also considered so as to reduce cumulative effects, particularly as they relate to successive harvests within a single watershed. Beach fringes and estuarian habitats are also avoided as much as possible.

Although not directly related to subsistence, there was concern expressed at the subsistence hearings by Alaska Natives about the protection of cultural resources. Mitigation designed to protect cultural resources includes the field reconnaissance of any areas with a moderate, or higher, probability of cultural resource presence. In addition, the Timber Sale Contract provides authority to suspend timber harvest or road construction activities on sites where cultural resources are discovered.

### Reasonable Foreseeable, Long-term, and Cumulative Programmatic Effects

The FEIS evaluates the reasonably foreseeable future effects of each Alternative. It also evaluates projected programmatic and cumulative long-term effects associated with continued implementation of the Forest Plan. The Subsistence Evaluation considers both types of long-term effects. The Forest Service is uncertain about the site specific location of future activities associated with long-term programmatic projections. The precise location of future projects is not clearly known until such time as a project is proposed. The Subsistence Evaluation for long-term programmatic effects concludes whether or not future activities may restrict subsistence uses.

The 1986-90 Operating Period Life of Sale Plan (Analysis) projects that an additional 18,780 acres of timber may be harvested from the VCUs in Analysis Area 12 by 2011. Under TLMP prescriptions Analysis Area 12, 97,912 acres are assumed to be available for timber harvest scheduling by 2080. The Wildlife and Fisheries sections project this level of harvest would affect the habitat capability of several wildlife species and may also affect the habitat capability of some salmon species. The changes in habitat capability could affect abundance and distribution. Most of these species are important subsistence resources used by the rural communities surrounding the Analysis Area.

Actions on other lands surrounding the Analysis Area may affect the abundance, distribution, access, and competition for the subsistence resources harvested by the rural communities using Analysis Area 12. Recent State land selection in No Name Bay for a future town site may result in long-term subsistence impacts.



## 4 Environmental Consequences

Enough is known about long-term Forest Service programmatic activities and potentially foreseeable activities on other lands surrounding Analysis Area 12, to project subsistence-uses may possibly be restricted in some future years.

The Forest Service is revising TLMP through the NEPA process. Potential effects to subsistence users will be addressed during the revision. Project environmental analyses will be required prior to harvest of any additional timber beyond the amount proposed in this project. Subsistence use effects will be evaluated in those analyses.

Should subsistence resources become limiting at some point, the Alaska Board of Game has the authority to regulate non-subsistence uses of these resources. This type of action, as prescribed by ANILCA Section 804, may be necessary to ensure the availability of adequate subsistence resources needed by the rural communities using Kuiu Island.

### FEIS Findings

Section 810 (a) (3) of ANILCA requires that when a use, occupancy or disposition of federal lands would significantly restrict subsistence use, determinations also must be made that the proposed action (1) is necessary and consistent with sound management of public lands, (2) involves the minimum amount of lands and (3) reasonable steps will be taken to minimize adverse impacts on subsistence uses and subsistence resources resulting from the action. As stated in the Findings above, there are no, or only slight significant possibilities of a significant restriction of subsistence uses due to project or reasonably foreseeable project effects. The Findings further project the implementation of long-term management direction (TLMP) combined with future actions on other surrounding lands, may restrict subsistence uses.

### Necessity (Consistent With Sound Management of Public Lands)

The actions proposed in this document have been examined to determine whether they are necessary and consistent with the sound management of public lands. Standards used for the review include (1) the National Forest Management Act of 1976 and its implementing regulations; (2) the Alaska National Interest Land Conservation Act; (3) the Alaska Regional Guide; (4) the Tongass Land Management Plan; (5) the Alaska State Forest Practice Act; and (6) the Alaska Coastal Management Program.

Based on the analyses presented in Chapters 1, 2, and 4, the selected alternative (proposed action) is necessary and consistent with the sound management of public lands.

### Amount of Land

The amount of land necessary to undertake the proposed action could be lessened somewhat by concentrating harvest in higher volume stands. However, the higher volume stands are those most valuable as fish and wildlife habitat. The alternatives represent a balance between impacting the fewest acres, meeting existing contract commitments, and minimizing impacts on other resources consistent with the standards referenced above. Thus, the minimum amount of public land necessary to meet the proposed action's purpose is involved.

### Steps Taken to Minimize Adverse Actions on Subsistence Uses and Resources

Chapter 2, displays the Standards, Guidelines and Mitigation Measures which will be implemented as part of the selected alternative. Most of the Standards, Guidelines and Mitigation Measures are designed to maintain fish and wildlife habitat productivity at as high a level as possible, consistent with meeting existing timber harvest contract commitments.

## Other Environmental Considerations

### Unavoidable Adverse Environmental Effects

Unavoidable adverse environmental effects are those effects resulting from resource use and development that cannot be effectively mitigated or avoided if the proposed action is to take place. Significant adverse consequences are eliminated or lessened through site planning, use of mitigation measures, and employment of standards or guidelines. These consequences are discussed earlier in this chapter. Remaining unavoidable consequences include: increased soil loss beyond naturally occurring levels; local and short-term reductions in water and air quality; alteration of natural landscapes; increased competition for subsistence resources; the disturbance or loss of some wildlife habitat; loss of primitive character of roadless areas that are entered; and loss of opportunities for wilderness designation of areas being entered. The intensity and duration of these effects depends on the alternative and the mitigation measures applied to protect the resources.

Most unavoidable effects are expected to be short term (usually less than two years). In all cases, the effects will be managed to comply with established legal limits, such as a maximum time for regeneration. In order to check and reduce these effects, monitoring procedures and mitigation measures have been planned for those harvest units that may be affected. Certain monitoring procedures and mitigation measures are required by existing standards or guidelines. Specific measures for each harvest unit are included on the Unit Cards in Appendix A-1.

### Relationship Between Short-Term Uses and Long- Term Productivity

The harvesting and use of standing timber can be considered a short-term use of that resource. However, timber is a renewable resource that can grow again if the productivity of the land is not impaired. All alternatives would come under the mandate of the Multiple Use and Sustained Yield Act of 1960, which requires the Forest Service to manage National Forest Lands for multiple uses, including timber, recreation, fish and wildlife, range, and watershed. All renewable resources are to be managed such that they are available for future generations. To ensure adequate production of timber, harvest has been scheduled to allow the earliest cut stands to grow merchantable timber before the planned harvest of original stands is complete. Then the stands will be harvested again on a new rotation. Mitigation measures, which are recorded on Unit Cards (Appendix A-1), are planned under all the alternatives to ensure future availability of other renewable resources.

### Irreversible and Irretrievable Commitments of Resources

Nonrenewable resources would be committed under all of the action alternatives. These resources include rock removed for road and facility construction and energy resources. The projected fuel consumption in addition to that already committed for Court authorized harvest in millions of gallons for each alternative is:

- Alternative 1 = 0
- Alternative 2 = 301
- Alternative 3 = 432
- Alternative 4 = 327
- Alternative 5 = 361

The action alternatives would result in some irretrievable losses, including some mature and overmature stands, wildlife habitat and primitive recreation opportunities. These losses are quantified for each alternative earlier in this chapter of the EIS. Entering a roadless VCU would cause irreversible and irretrievable loss of the pristine character of the area that could



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influence future land management options such as wilderness designation. Roadless VCUs, which would be entered under each alternative are listed below:

- Alternative 1 = None
- Alternative 2 = None
- Alternative 3 = 417 and 418
- Alternative 4 = None
- Alternative 5 = None

Although these losses may be considered irretrievable for practical purposes under the TLMP and Life of Sale Plan, these resources will eventually re-establish if left undisturbed.

### Possible Conflicts Between the Alternatives and Other Land Use Objectives

The major land use regulations of concern are the Alaska Coastal Management Program and Section 810 of ANILCA. The alternatives proposed in this supplement have been evaluated by the Forest Service against the applicable provisions of the ACMP and found to be consistent to the maximum extent practicable.

Under ANILCA, Section 810 agencies are required to evaluate the effects of proposed actions on subsistence uses of federal land and to determine if the proposed action significantly restricts subsistence opportunities. Refer to the Subsistence sections of this chapter for the evaluation of impacts to subsistence uses as a result of the alternatives.

All of the alternatives are designed to conform to applicable laws, regulations, and standards regarding conservation of depletable natural resources.

### Urban Quality, Historic and Cultural Resources and the Design of the Built Environment

Analysis Area 12 contains no urban areas and very little built up area of any kind. Therefore, the only applicable concern is with historic and cultural resources. The goal of the Forest Service's Cultural Resources Management Program is to preserve significant cultural resources in their field setting and ensure they are available in the future for research, social/cultural purposes, recreation, and education. The direct and indirect affects of the alternatives have been evaluated and determined to meet the program goals. (See Cultural Resources Section, Chapter 4).

## Mitigation

The Forest Service uses numerous mitigation, enhancement, and preventative measures in day-to-day practice (e.g., Forest Service Handbook on aquatic habitat management, Forest Service 1986a). These measures are employed for a variety of reasons such as fish and wildlife habitat protection or enhancement, protection of aesthetic values, prevention of landslides, prevention of windthrow, and timber stand improvement. In the 1986-90 FEIS, beginning on page 2-66 (Forest Service 1986b), the standards, guidelines, monitoring, and mitigation measures were discussed in some detail, especially for measures that protect the fisheries resource, such as development of Aquatic Habitat Management Units.

The application of these measures begins during the planning phases of a project, links to the overall Forest, Stikine Area, and Ranger District management plans, and continues through all phases of subsequent forest management. The first objective is to foresee and avoid or prevent a potential problem in the planning phases. For example, roads are not planned for slopes steeper than 75 percent or on high hazard soils. Also, the Tongass Land Management Plan land use designations identified areas of the Forest with the highest amenity values and set them aside from timber harvest activities.

There are several stages of implementing plans for a timber harvest unit. The steps get progressively more specific and culminate with on-site inspections by resource specialists who may make final adjustments in the site plans prior to any construction activities. The adjustments may require moving a harvest unit boundary to avoid a stream segment, reduce the



likelihood of remaining timber blowing down, or reduce the effects on the visual resource. These final changes are recorded on the Unit Cards that provide the specific requirements that must be followed to harvest that unit. Similar levels of planning for roads and other activities are also applied. Forest Service personnel also inspect the work of contractors to ensure compliance. Most of the mitigation measures to be used during the implementation phase and after the project are identified during the planning phases of a project. They may be modified as the project develops, however, due to varying field conditions, in order to best accomplish the intent of the standards and guidelines in the Final EIS and Record of Decision. Examples of mitigation measures are listed below. Specific application of the mitigation measures to individual units are listed on the Unit Cards in Appendix A-1.

Mitigation measures include the following:

## **Soils**

1. Suspend logs during yarding to protect sensitive soils.
2. Insure that culverts are removed from temporary roads and water bars are installed to lessen soil erosion.
3. Limit cut and fill slopes to 4 feet or less on “blue clay” soils.
4. Do not allow side casting of spoil material on mid-slope roads with steep side slopes.

## **Timber Productivity**

1. Certify natural regeneration of stands within three to five years following harvest.
2. Schedule all harvested stands for precommercial thinning between 12 and 20 years of age. This is becoming a normal practice if budgets are not constrained.

## **Wildlife**

1. Apply “state of the art” second-growth management techniques for areas of harvested deer winter range. Current techniques may include thinning and “gap management”. While such techniques have proven effective in other locations, they are new to Southeast Alaska and it is still premature to judge their effectiveness.
2. Protect existing habitat for bald eagles by establishing and maintaining a minimum 100 meters radius habitat management zone around each eagle nest tree.
3. Maintain trees suitable for use by eagles for hunting, feeding, and perching.
4. For raptors other than eagles, protect any snag or tree containing an evident raptor nest. Prohibit management activities within 100 meters of any active raptor nest from May 1, to July 31, when nesting birds would be most likely to be disturbed.
5. Where feasible and consistent with safety standards, retain snags to preserve adequate snag-habitat. Following are guidelines used to prioritize which snags to retain:
  - Only designated snags will be left in cutting units.
  - Spike-top, high stumped, broken-topped, rotten, and other unmerchantable live or dead trees may be designated as snag-habitat.
  - Snags designated should be no less than 11 inches DBH and 15 feet in height.

## **Fisheries/Watershed**

Most fish habitat is included in Class I Aquatic Habitat Management Units (AHMUs). For Class I AHMUs, the specific standards and guidelines, including the measures employed to accomplish the standards and guidelines, are described below. Standards and guidelines for Class II and III AHMUs are generally less restrictive than those for Class I AHMUs. See the

## 4 Environmental Consequences

Aquatic Habitat Management Handbook (USDA Forest Service 1986a) for these standards and guidelines.

1. Maintain existing (natural) stream channel and bank conditions with specific reference to: stream width-to-depth ratio, pools and riffles (sequence, volume, and depth), undercut banks, stable debris, and other in-stream cover characteristics. To accomplish this, the following measures will be employed.
  - Directionally fall timber away from streamcourses (to include lining and jacking if necessary).
  - Split the yarding on the stream or fully suspend timber over the streamcourse.
  - Do not limb timber within or suspend over the streamcourse.
  - Remove all small, unattached debris less than 4 inches in diameter that is introduced into the streamcourse by human-related activity within 48 hours of its introduction.
  - Do not remove windthrow and inadvertently felled timber affecting the streamcourse unless it adversely impacts fish habitat, as determined by a fish biologist.
  - Leave standing all trees which affect streambank stability, including all deciduous and unmerchantable vegetation.
  - If significant areas of mineral soil are exposed, these areas will be grass seeded and fertilized within the first growing season.
2. Maintain average daily maximum summer temperatures below 58 degrees F. On streams with normal, daily summer maximum temperatures in excess of 58 degrees F, maintain average summer maximum temperature.
  - No timber harvest should occur that would reduce critical stream shading on streams known to have excessive temperatures.
  - Along streams with known potential temperature sensitivity, retain at least 75 percent of the shade producing vegetation next to the stream. Additionally, timber harvest should be limited to 660 linear feet per harvest unit along the southern, southwestern, southeastern, and western sides of streams. Harvest along other aspects should be limited to 1300 linear feet per unit.
  - All standing vegetation less than 12 inches diameter breast height (DBH) within the AHMU will be retained whenever possible.
3. Maintain the natural migration routes of adult and juvenile anadromous and high-quality resident sportfish.
  - Provide passage for adult pink and chum salmon in all cases.
  - Provide passage for all other species on all streams with natural stream gradients of 4 percent or less, using typical designs for bridges or culverts installed at a grade of 1 percent or less. For streams with gradients steeper than 4 percent, evaluate the potential trade-off between the loss of rearing fish production and the cost of providing rearing fish passage. The 4 to 6 percent gradient stream reaches are especially critical since standard culvert design cannot be implemented to provide fish passage. Fish passage on these gradients requires open-bottom structures, baffled culverts or other non-standard structures, which are much more costly than standard designs. See the Aquatic Habitat Management Handbook (USDA Forest Service 1986a) for an explanation of the trade-off evaluation method.
4. Maintain water quality for the propagation of fish, shellfish, and other aquatic life as defined by the State of Alaska, Water Quality Standards, (amended February 1979).

- Culverts should be properly bedded to prevent undermining and eroding seepage, and should utilize energy pools or other dissipating techniques at the outfall.
  - Stream crossings should be located where switchbacks and bridge approaches would not create drainage problems.
  - Bridge abutments should be designed to minimize disturbance to streambanks.
  - Areas of exposed mineral soil should be revegetated during the first growing season following exposure.
  - Timber harvest settings that cross streams are undesirable. Where unavoidable, they should be located to permit practical yarding techniques that minimize adverse impacts. Techniques that have been found acceptable include, but are not limited to right angle crossings and full suspension yarding.
  - Minimize use of equipment in streams.
  - Natural filter strips should be left where necessary to filter the sediment carried by water flowing from disturbed areas such as roads, landings, and sort yards
5. Provide, in perpetuity, future sources of large organic debris (LOD) to aquatic habitats while maintaining and/or enhancing quantities of existing instream debris.
- Retain trees that cannot be directionally felled away from stream or those that would result in serious impacts to the AHMU.
  - Do not remove suspended LOD over the stream.
  - Retain an adequate number of trees for LOD, as determined by fisheries biologists, on both sides of the stream if both sides are proposed for harvest.
  - Coordinate future sources of LOD with second-growth management program.
  - Retain within 75 feet of the stream, 1) all deciduous trees, 2) all conifer trees less than 12" DBH, 3) all snags, 4) coniferous trees of all sizes with a 10% or greater lean over the stream, and 5) other large coniferous trees as needed for future sources of LOD.
  - Trees that are felled into or across streams should be left in place. Unattached small debris (less than 4" diameter) shall be hand removed within 48 hours.
  - Trees preferred for retention, based upon length of their expected useful life as LOD, are prioritized as follows: 1) cedar, 2) spruce, and 3) hemlock. A mix of species is preferred, however, and should be maintained whenever possible.
  - Maintain existing LOD by not salvaging windthrown trees suspended over the stream or on the streambanks unless specifically designed for fish habitat enhancement on a case-by-case basis.
  - Maintain existing LOD by not removing existing (natural) instream debris.
6. Increase primary and secondary biological production in streams without adversely affecting juvenile salmonid habitat.
- Mixed stands along streams with gradients between 0 and 6 percent, can normally be precommercially thinned to the streambank edge.
  - Alder immediately adjacent to the stream should be managed to provide 75 percent shade on the stream.
  - Priority for precommercial and commercial thinning should be given to stands adjacent to streams that could benefit from such activity.



- All streamside vegetation along streams with gradients between 0 and 6 percent should be managed to keep daily maximum water temperatures below 58 F. while opening the stream to sunlight.
- Complete canopy removal treatments should only be used along stream sections with abundant instream cover or along streams which are not temperature sensitive (see guidelines for temperature sensitivity in AHMU Handbook (USDA Forest Service 1986a)).

## Recreation

1. Monitor cabin use in the Kadake Creek cabin to determine if future access needs to be restricted.
2. Provide trail sign to direct recreation traffic along Aleck's Lake Trail.
3. Reconstruct trail heads at road crossings, if necessary, to provide continued access to the Aleck's Lake trail.
4. If an LTF is constructed at No Name Bay, provide a "stiff leg" public mooring facility to replace the existing anchorage there.

## Visual Resources

1. Create irregular unit boundaries on visually sensitive units.
2. Design rockpits to eliminate visibility to saltwater travelers.
3. For areas of Partial Retention Visual Quality Objective (VQO): Design activities to be subordinate to the landscape character of the area within one year of project completion. The following measures will be employed to accomplish this:
  - In designing facilities, emphasize enhancement of views both to and from the facility and use colors found in the natural environment, considering seasonal variations.
  - Design quarries and rock sources in locations not visible from sensitive travel routes. Rehabilitation plans will be developed for implementation following closure of rock source developments.
  - Rehabilitation plans will be developed for implementation at the close of temporary LTFs.
  - A landscape architect on the Forest should be involved in all stages of permanent LTF planning and design. Low profile designs should be considered to minimize visibility from adjacent travel routes.
4. For areas of Modification VQO activities may visually dominate the original characteristic landscape, however, the following measures will be employed to achieve minimal landscape modification where possible.
  - Utilize naturally occurring form, line, color, and texture found in the natural landscape when planning activities.
  - Design of transportation and harvest facilities should borrow from naturally occurring patterns in the landscape, and should not be visually dominate when viewed as background. Siting of facilities should also consider this standard.
5. For areas of Maximum Modification VQO, the landscape may be dominated by management activities. Nevertheless, activities should be designed to resemble natural occurring features when viewed as background.

## **Cultural Resources**

1. Avoid known cultural sites. This is coordinated with the State Historical Preservation Officer and has been effective for preserving known sites. A cultural resource specialist on the Forest will survey those sites proposed for harvest that have not been previously surveyed for archeological resources prior to harvest.
2. Contract provisions require the reporting of cultural resources found during project implementation and provide for the modification of harvest units to keep harvest operations away from cultural resources and restore the site, if necessary (APC Contract, Section 7K).





# **Chapter 5**

## **List of Preparers**



# Chapter 5

## List of Preparers

### US Forest Service

#### **Dick Aho, Fisheries Biologist**

M.S., Fisheries, Oregon State University, 1975

B.S., Wildlife Science, Oregon State University, 1970

Forest Service: 8 years

Area Fisheries Biologist, Tongass National Forest

Other Employment:

Fisheries Biologist, Oregon Department of Fish and Wildlife (5 years)

#### **Rob Aiken, Civil Engineer/Transportation Planner**

B.S., Forest Engineering, Oregon State University

Forest Service: 10 years

Civil Engineer, Stikine Area S.O. (5 years)

Forester Alsea Ranger District, Suislaw National Forest (4 years)

Coop Ed Student (2 years)

#### **Robert H. Burke, Forester, Logging Systems Specialist**

B.S., Forest Management, North Carolina State University

Forest Engineering Institute

In-house formal training in landscape architecture, soils, fisheries, silviculture, and archeology

Forest Service: 25 years

Experience in all aspects of forest management, layout, reconnaissance, planning logging systems, and multi-entry layout planning specialist, Petersburg Ranger District, Petersburg, Alaska.

#### **Deirdre P. Buschmann, Landscape Architect, Visual Resource**

B.S., Landscape Architecture, University of Washington, Seattle, 1980

Forest Service: 8 years

Forest Service employment has been on the Stikine Area, Tongass National Forest

Forest Landscape Architect (4 years)

Landscape Architect (4 years)

Engineering Draftsman (1 year)

Clerk Typist (1 year)



**Janis Burns Buyarski, Stikine Area Phase II Team Leader**

B.S., Forestry, University of Illinois, Urbana

Forest Service: 10 years

Management Systems Program Manager (1 year)

Timber Contract and Appraisal Specialist, Stikine Area (3 years)

Forester, Wrangell Ranger District, Wrangell, Alaska (1 year)

Forester, Idaho City Ranger District, Idaho City, Idaho (3 years)

Forestry Technician, Sault Ste Marie Ranger District, Saulte Ste Marie, Michigan (1 year)

Forestry Technician (Surveying), St. Ignace Ranger District, Michigan (1 year)

Other Employment:

Consulting Forester (6 months)

**Michael Condon, Stikine Area Phase II Team Leader**

B.S. Finance/Economics, California State University, Sacramento

Graduate Studies, Business Administration, California State University, Chico

Forestry, University of Washington

Forest Service: 15 years

Land Management Planning Team Leader, Lassen N.F. (2.5 years)

Forest Economist, Lassen National Forest (2.5 years)

Fire Management, Lassen National Forest (7 years)

Fire Management, Eldorado National Forest (1 year)

Fire Management, Mendocino National Forest (2 years)

Other Employment:

Lecturer, California State University, Chico (2 years)

Economic Research Consultant (1 year)

**Mark A. Cooper, Stikine Area Phase I and II Team Leader**

A.S., Math/Science/Engineering, Lincoln Land Community College, 1971

B.S., Forest Resource Management, Southern Illinois University, 1973

Certificate, Forest Engineering Institute, Oregon State University, 1980

Two years graduate studies toward M.S. in Land Use Planning Policy, University of Nevada-Reno, 1985-86

Forest Service: 10 years

Forester, Resources Evaluation, NE Forest Experiment Station (3 years)

Forester, Timber Sale Preparation, R-10, Wrangell Ranger District (5 years)

Forester, Timber Sale Planning, R-10, Petersburg Ranger District (1 year)

NEPA/Appeals Coordinator, R-10, Stikine Area (1 year)

Other Employment:

Washoe County Department of Comprehensive Planning, Reno, Nevada (1 year)

**Bob Daniels, Wildlife Biologist**

B.S. Wildlife Biology, University of Montana, 1969  
Graduate Studies, Colorado State University  
Washington State University

Forest Service: 20 years  
Stikine Area Planning Biologist (<1 year)  
Wilderness/Wildlife Forester, Bitterroot National Forest (10 years)  
Forester, Timber Management, Bitterroot National Forest (5 years)  
Forestry Technician, Planning/Fire Mgt, Bitterroot National Forest (4 years)

Other Employment:  
Own Business (3 years)  
Seasonal Logging and Farming (2 years)

**Ronald M. Dippold, Forester**

B.S., S.U.N.Y. College of Forestry, 1958  
Graduate Work in Statistics and Forest Administration, 1966-1967  
Graduate Work in Public Administration

Forest Service: 25 years  
Timber Management, Inventory, Plans, Silviculture, Budget, and Appeals, Regional Office,  
Alaska Region (12 years)  
Forester, Forest Inventory and Research, Pacific Northwest Forest and Ranger Experiment  
Station, Juneau, Alaska (12 years)  
District Assistant for Range, Wildlife, and Lands, Ochoco National Forest  
Range Survey and Mapping, Timber Sale Administration, and Mining Claims, Ochoco  
National Forest  
Silviculture and Fire Control, Ochoco National Forest

**Bob Gerdes, Forester**

B.S., Iowa State University

Forest Employment: 24.5 years  
Experience in logging systems design and planning (MELP), unit layout, timber planning,  
and all aspects of forestry.

**Dave Helmick, Transportation Planner**

Forest Service: 22 years  
Civil Engineering Technician, Stikine Area, Tongass National Forest (11 years)  
Civil Engineering Technician, Idaho Panhandle National Forests (2 years)  
Civil Engineering Technician, Stikine Area, Tongass National Forest (2 years)  
Civil Engineering Technician, Clearwater National Forest (2 years)  
Civil Engineering Technician, Payette National Forest (3 years)  
Civil Engineering Technician, Shasta-Trinity National Forest (2 years)

Other Employment:  
Surveying Aid, Siskiyou National Forest, 1965  
Surveying Aid, Siskiyou National Forest, 1964

**Gail Johnejack, Hydrologist**

B.S., Hydrology, Wildland and Watershed Management, Utah State University

Forest Service: 6 years

Stikine Area Hydrologist

Other Employment:

USFS Lake Tahoe Basin Management Unit (4.5 years)

Lake Tahoe Regional Planning Agency (6 months)

**Everett Kissinger, Soils Scientist**

B.S., Soil Science, University of Wisconsin, Madison

Forest Service: 11 years

Forest Soils Scientist, Tongass National Forest, Stikine Area

Watershed Staff Officer, Tongass National Forest, Stikine Area

Other Employment:

Soil Scientist with the USDA Soil Conservation Service (10 years)

**Jay Kittams, Forester, Certified Silviculturist**

B.S., Forestry, University of Montana, 1970

Forest Service: 23 years

Forester, Silviculturist (9 years)

Forester, Salmon National Forest (1 year)

Forester, Boise National Forest (4 years)

Forester, Intermountain Forest and Range Experiment Station, R1-R4 (5 years)

Seasonal Employee (5 years)

Other Employment:

U.S. Navy (2 years)

**Lyle Krueger, Cartographic Technician and Consultant**

Forest Service: 14 years

Geometronics, Cartographic Technician and Special Maps, Regional Office, Alaska Region (8 years)

Cartographic Technician and Primary Base Geometronics, Service Center (4 years)

Cartographic Technician and Primary Base Geometronics, Regional Office, Region 9 (4 years)

Engineering Technician, Regional Office, Region 9 (2 years)

**Marilynne E. Lawson, Cartographic Technician**

Forest Service: 13 years

Cartographic Technician, Regional Office, Alaska Region (8 years)

Cartographic Aid/Technician, Region 6 (5 years)

Other Employment:

Cartographic Technician, U.S. Bureau of Mines (5 years)



**Mike McCorison, Hydrologist**

B.S., Forestry, University of Minnesota  
M.S., Forest Water Quality, University of Minnesota

Forest Service: 10 years  
Stikine Area Hydrologist

Other Employment:  
Researcher, Oregon State University (5 years)  
U.S. Air Force (5 years)  
Logger, Contractor, Truck Driver

**R. Michael Martin, Economist**

B.A., Economics, University of California, Santa Barbara, 1973  
M.S., Economics, University of Oregon, 1979  
Ph.D., Economics, University of Oregon, 1981  
Other Employment:

Finance and Administration Officer, United Nations, Rome, Italy (3 years)  
Economist, Bureau of Land Management (6 years)

Private Consultant (4 years)  
Local Government Planner, Roseburg, Oregon (1 year)

**Dave Niemann, Cartography Section Supervisor**

B.S., Wildlife Management, Utah State University  
B.S., Biological Sciences, Utah State University  
Masters Biological Sciences Education, Utah State University

Forest Service: 10 years  
Geometronics Cartography Section Supervisor, Regional Office, Alaska Region  
Other Employment:  
Digital Land Mass Simulation - Production Section Supervisor, Imagery Analysis  
Techniques Office  
Defense Mapping Agency, Aerospace Center, St. Louis, Missouri

**Henry W. Newhouse, Fisheries/Wildlife/Subsistence/Mitigation**

B.S., Fisheries Biology, Humboldt State University, 1972  
Fisheries Biology, Graduate Studies, Humboldt State University  
Forest Service: 14 years  
Fisheries Biologist, Wildlife and Fisheries Staff, Regional Office, Alaska Region (7 years)  
Forest Fisheries Biologist, Nezperce National Forest (3.5 years)  
Forest Fisheries Biologist, Kootenai National Forest (2 years)  
District Wildlife/Fisheries Biologist, Warner Mountain Ranger District, Modoc National  
Forest (1.5 years)

Other Employment:  
Graduate Fellowship, California Cooperative Fisheries Unit, Humboldt State University,  
2 years

**James Pierce, Team Leader**

B.S., Forest Engineering, Oregon State University, 1966

Forest Service: 17 years

District Ranger, Willamette National Forest and Mt. Hood National Forest (5 years)

Group Leader for Planning, Regional Office, Alaska Region (3 years)

Planning Staff, Ochoco and Umpqua National Forests (3 years)

Logging Engineer, Ochoco National Forest (1 year)

Misc. Forester Positions on Willamette and Mt. Hood National Forests (5 years)

Other Employment:

Consulting Forest Engineer (1 year)

General Manager, Sawmill (2 years)

**Kenneth D. Vaughan, Engineering Transportation Planner**

B.S., Civil Engineering

M.S., Civil Engineering with Industrial Engineering Minor

Predoctoral Studies: Civil and Industrial Engineering

Forest Service: 17 years

Other Employment:

Part-time Instructor, University of Alaska (7 years)

**John Warner, Logging Engineer**

B.S., Forestry, Oregon State University, 1955

Logging Engineering Program, Pacific Northwest Forest and Range Experiment Station

Forest Service: 29 years

Regional Logging Engineer, Regional Office, Alaska Region

Logging Engineering Staff, Regional Office, Pacific Northwest Region

Assistant Timber Staff, Six Rivers National Forest, California Region

Engineering Technician (GS-11) California Region

**Elsan Zimmerly, Photographic Coordinator, Writer/Editor**

B.S., Forestry Recreation, Colorado State University, 1984

Country School of Photography, Vermont

Forest Service: 4 years

Writer/Photographer, Regional Office, Alaska Region (2 years)

Naturalist, Alaska Region (2 years)

Photographic Coordinator; Begich, Boggs Visitor Center, Portage, Alaska

Other Employment:

Instructor of Photography, Experimental Learning Program, Colorado State University  
(6 years)

Writer/Photographer; Poudre Magazine, Triangle Review, Choice Magazine,  
Fort Collins, Colorado.

Freelance Writer/Photographer (15 years)

**Dames & Moore: Janine C. Blaeloch, Technical Writer/Editor/Environmental Planner**

Landscape Architecture, University of Washington  
B.A., Environmental Studies, University of Washington, 1989

Dames & Moore: < 1 year  
Technical Writing  
Environmental Analysis

**A. David Every, Project Team Leader/Senior Terrestrial Ecologist**

B.S., Zoology, University of Utah, 1967  
M.S., Botany, University of Utah, 1969  
Ph.D., Botany, University of Washington, 1977

Dames & Moore: 1 year  
Project Manager  
Environmental Impact Assessment  
Habitat Evaluation Procedure  
Wetlands/Terrestrial Ecology

Other Employment:  
Envirosphere Company, Terrestrial Ecologist (5 years)  
NUS Corporation, Terrestrial Ecologist (3 years)  
Principal Investigator in various consulting capacities (1 year)

**Deborah J. Flynn, Technical Writer/Editor/Coordinator/Environmental Planner**

B.S., Natural Resource and Recreation Planning and Forestry, Oregon State University, 1984  
M.S., Natural Resource Economics, University of Arizona, 1986

Dames & Moore: 2 years  
Natural Resource Economics  
Technical Writing  
Public Relations

Other Employment:  
U.S. Forest Service (3 years)

**Phillip J. Leapley, Technical Writer/Coordinator/Technical Ecologist**

B.S., Biology, Washington State University, 1977  
M.S., Environmental Science, Western Washington University, 1980

Dames & Moore: 1 year  
Habitat Evaluation  
Mitigation Planning  
Environmental Impact Statements  
Permit Applications  
Property Transfer Site Assessments

Other Employment:  
Hosey and Associates, Project Ecologist (2 years)  
RW Beck and Associates, Project Ecologist (2 years)  
Washington State Department of Transportation, Environmental Planner (1 year)  
GPA Consulting Services, Biological Consultant (3 years)



**Douglas J. Martin, Technical Writer/Senior Biologist**

B.S., Water Resource Management and Pollution Ecology, University of Washington, 1971

M.S., Fisheries Biology and Aquatic Ecology, University of Washington, 1976

Ph.D., Fisheries Science and Salmonid Ecology, University of Washington, 1985

Dames & Moore: 2 years

Environmental Impact Assessments

Managing and Conducting Baseline Studies

Project Manager--Salmonid Ecology and Fisheries Biology, Fish Habitat Restoration and Enhancement

Other Employment:

Envirosphere Company, Senior Scientist (4 years)

Independent Consultant (7 years)

University of Washington Fisheries Research Institute, Fisheries Biologist (7 years)

**Robin Scheid, Technical Writer/Coordinator/Editor/Marine Biologist**

B.S., Marine Biology, Davidson College, 1986

Dames & Moore: 1 year

Technical Writing

Marine Biology Field Technician

Oceanography Field Technician

Other Employment:

National Marine Fisheries Service, Fisheries Biologist (2 years)

Schooner, Inc., Marine Biologist (1 year)

**Kathryn J. Stenberg, Technical Writer/Editor/Coordinator/ Wildlife Ecologist**

B.A., Biology-Environmental Studies, Whitman College, 1980

M. Admin., Environmental Administration, University of California, Riverside, 1982

Ph.D., Wildlife and Fisheries Sciences, University of Arizona, 1988

Dames & Moore:<1 year

Environmental Impact Assessments

Habitat Evaluation

Technical Writing

Other Employment:

University of Arizona, Research Associate (5 years)

King County Building and Land Development Division, Utilities Planner(<1 year)

University of California, Riverside, Research Associate (2 years)

**Gail Thompson, Technical Writer/Coordinator/Editor/Senior  
Environmental Scientist**

B.A., Anthropology, University of Washington, 1969

M.A., Anthropology, University of Washington, 1971

Ph.D., Anthropology, University of Washington, 1978

Dames & Moore: 3 years

Managing and Conducting Hazardous Waste Assessments

Senior Project Manager

Senior Archeologist

Senior Environmental Analyst

Senior Anthropologist

Other Employment:

Hart Crowser, Inc., Cultural Resources Specialist (2 years)

The Earth Technology Corporation, Manager of Cultural Resources Services (6 years)

Shannon and Wilson, Inc., Staff Archeologist (1 year)

University of Victoria, Visiting Lecturer (1 year)

Wilke-Thompson, Partner (4 years)

University of Delaware, Anthropology Instructor (1 year)

**Photo  
Contributors**

Alaska Pulp Corporation

Alaska Department of Fish & Game

Alaska State Library

George Figdor

Rex Friend

Mike Jacobson

Nancy Mitter Andison

Elsan Zimmerly





# **Chapter 6**

**List of Agencies,  
Organizations, and  
Persons to Whom  
Copies of this  
Statement Were Sent**



# Chapter 6

## List of Agencies, Organizations, and Persons to Whom Copies of this Statement Were Sent

Name	Organization
Don Cornelius	Alaska Dept. of Fish & Game
Jack Gustafson	Alaska Dept. of Fish and Game
R.Larson & J.Edgington	ADF&G, Commercial Fisheries
Don Ingledue	ADF&G, Commercial Fisheries
Gregory Thomason	ADF&G, Commercial Fisheries
Robert Schroeder	ADF&G, Subsistence Division
R.Bosworth & B.Schroeder	ADF&G, Subsistence Division
Don Cornelius	ADF&G, Habitat Division
Dave Hardy	ADF&G, Habitat Division
R.Reed & L.Shea	ADF&G, Habitat Division
Jeffrey Hughes	ADF&G, Nongame
S.Elliott & M.Schwann	ADF&G, Sport Fisheries Division
F.Gaffney & M.Bethers	ADF&G, Sport Fisheries Division
Artwin Schmidt	ADF&G, Sport Fisheries Division
	ADF&G, Game Division
E.L. Young	ADF&G, Wildlife Conservation Division
D.Anderson & M.Kirchoff	ADF&G, Wildlife Conservation Division
David James	ADF&G, Wildlife Conservation Division
Rod Flynn	ADF&G, FRED Division
	Agr. Stabilization & Cons.
Dick Tsuru	AK PAC, Trading Co.



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Name	Organization
	Alaska Legal Services Corp.
Vance Sanders	Alaska Legal Services Corp.
Walter Pasternak	Alaska Troller's Association
	Alaska Native Brotherhood
	Alaska Miners Association
	Alaska Pulp Corporation
Frank Ropell	Alaska Pulp Corporation
	Alaska House Resource Committee
	Alaska Senate Resource Committee
	Alaska Federation of Natives
E. O. Bracken	Alaska Miner's Association
Richard Myren	Alaska Biological
Dave Sturdevant	Alaska Dept. Of Environmental Conservation
Jonathan W. Scribner	Alaska Dept. of Transportation/Public Facilities
Documents Librarian	Alaska State Library
Earl Krygier	Alaska Trollers Association
Rep. Kayn Wallis	Alaska State Legislature
Sally Coady	Alaska Women in Timber
Gregory Head	Alaska Timber Corporation
Diane Mayer	State of Alaska/OMB-DGC
Art Kennedy	ALUC, Land Use Advisory Comm.
Craig Lindh	ALUC, Staff,Comm. Part./OMB-DGC
Office of the Fed Cochairman	ALUC
Wayne Ross, Esq.	ALUC, Land Use Comm., Dec
Ron McCoy	ALUC, Staff AK Land Use Council
	Anchorage Municipal Libraries
Jim Labau	Anchorage Forestry Science Lab
Alaska Collection	Anchorage Municipal Libraries
	City of Angoon
Dave Rose	Angoon High School
K.J. Metcalf	Angoon Trading Company
	Angoon Community Association
	Angoon Public School
George Jim, Sr.	Angoon Advisory Committee
Lee L. Antrim	Antrim Associates

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Name	Organization
Richard Ogar	Arco Alaska, Inc.
Dr. George Snyder	Auke Bay Lab.
Tom L. Pittman	Bureau of Mines
	Bureau of Land Management
Avrum Gross	Chatham Cannery Partnership
	Chec - Forest Watch
Warren Pellett	Chevron Marina
Larry Beck	Chilkoot Lumber Co.
Phil R. Holdsworth	Citizen's Advisory Commission
Sen. Bettye Fahrenkamp	Citizen's Advisory Committee
	Commissioner Dept. Nat. Resources
	Cooke Cablevision
Mary Lucile Born	Craig Public Library
Jeannette Konoske	Credit Bureau of Sitka, Inc.
	Dames & Moore
J. Sonnenfeld	Department of Geography
Douglas Public Library	c/o Juneau Memorial Library
	Div. of Land & Water Management
Jim Mc Allister	Div. Of Forestry
Peggy Simons	Division of Public Services
Dr. Helen Mc Cammon	Ecological Research Division
Bob Mourant	Elfin Cove Advisory Committee
	Elfin Cove Advisory Committee
Greg Howe	Elfin Cove Advisory Committee
Patrick Ahtey	ENSR
	Environmental Protection Agency
	Esther Greenwald Public Library
	Fairbanks Public Library
Clare Doig	Foresters and Managers, Inc.
Russel Bartoo	Gastineau Channel Advisory Committee
Nick Yurko	Gastineau Channel Advisory Committee
	General Services Administration

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Name	Organization
Marvin O. Jensen	Glacier Bay National Park
J. & M. Rosenbruch	Glacier Guides
	Haines Borough Public Library
Robert L. Hames	Hames Corporation
Robert C. Prefontaine	High Drive Drilling
	City of Hoonah
Liv C. Gray, Mayor	City of Hoonah
Al Hill	Hoonah Advisory Committee
Gordon Pederson	Hoonah Advisory Committee
Wanda Culp	Hoonah Indian Association
	Huna-Totem Corporation
	Hydaburg School District
	Irene Ingle Public Library
	Irene Ingle Public Library
	Island News
	Juneau Chamber of Commerce
	Juneau Memorial Library
M.J. Bishop	Kaiser Cement Corp./Mineral Res
	Kake Tribal Corporation
	Kake City Office
	Kake City Community/School Lib.
Ken Mears	Katnai Sportfishing Guides
Steve Connelly	Ketchikan Pulp Co., Thorne Bay
	Ketchikan Daily News
	Ketchikan Public Library
	Kattleson Memorial Library
Jo Ann Ross	KHNS Radio
Don Fleeman	KIFW-Radio
	Klawock Heenya Corporation
Robert Loiselle	Klukwan Forest Products, Inc.
Walter A. Soboloff	Kootznoowoo Corporation
Ethel Bergman	City of Kupreanof
Rhonda Lichtwake	KSTK-FM



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Name	Organization
	Marine Mammal Commission
Carl A. Newport	Mason, Bruce & Girard, Inc
	Mendenhall Valley Public Library
Don Brown	Mud Bay Logging Company
Steve Pennoyer	National Marine Fisheries Service
DR. K. Koski	NMFS, Auke Bay Lab
Sonia Naubaver	News Director, KFSK
	Office of Environment Review
	City of Pelican
	Pelican Public Library
	Pelican Public Library
	City of Petersburg
	Petersburg Public Library
Sig Mathisen	Petersburg Vessel Owners Assoc. Clyde Curry
	Petersburg Advisory Committee
	Petersburg Pilot
Bob Tkacz	Petersburg Pilot
	City of Port Alexander
	City of Port Alexander
William E. Odell	Planning Commission
Becky Gay	Resource Development Council
James Clark	Robertson, Monagle, Eastaugh & Bradley
Greg Minor	Saltman and Stevens
John Fausti	Saltman and Stevens
Linda Kruger	SE Region, Alaska State Parks/DNR
Mike McKinnon	SE Region, Tech. Services
Robert Himman	SE Regional Council
	SEACC
Robert W. Loescher	Sealaska Corporation
Michael K. Snowden	Service Transfer, Inc.
Glen Charles	Shaan-Sect, Inc.
James Senna	Shee Atika, Inc.
Dr. Ron Dick	Sheldon Jackson College

## 6 List of Agencies, Organizations, and Persons to Whom Copies of this Statement Were Sent

Name	Organization
	Alaska Chapter, Sierra Club
Edgar Wayburn	Sierra Club
Mark Cooper	Siskiyou NF
Mark Cooper	Siskiyou NF
Molene Capbell	City and Borough of Sitka
T. Smith	Sitka Advisory Committee
	Sitka Chamber of Commerce
Virgil Henke	Sitka Advisory Committee
	Skagway Public Library
Bruce Johnson	Society of American Foresters
Environmental Coordinator	Soil Conservation Service
Don Soukup	Soukup Wire Rope
Kate Troll	Southeast Seiners Assoc.
	Southeastern Log
Adele Backeil	Spec CRS-ENR, LM-423
	State-Fed. Coord./Project Alaska
	Stratton Library
Joseph Sebastian	Sumner Strait Advisory Comm.
Warren F. Powers	Sumner Strait Advisory Comm.
L.L. Schroeder	Supt. Hydaburg School
	City of Tenakee Springs
	Tenakee Springs Public Library
Don See	Tenakee Advisory Committee
	Thorne Bay Community Library
	Timber Faller, Inc
	Tlingit-Haida Central Council
Geron Bruce	U.S.A.G.
Steve Colt	University of Alaska, Anchorage Director. Envir
	US Dept. of Interior
	US Fish & Wildlife Service
Marcus Horton	US Fish & Wildlife Service
Michael Jacobson	US Fish & Wildlife Service
Wayne Oien	US Fish & Wildlife Service
	US Army Corps of Engineers

# List of Agencies, Organizations, and Persons to Whom Copies of this Statement Were Sent 6

Name	Organization
Comm. Douglas Smith	US Coast Guard District 17
Representative Young	US House of Representatives
F. Dale Robertson, Chief	USDA, Forest Service, Washington, D.C.
Larry Ethelbath	USDI-BIA, Forestry/S.E. Agency
Dick Powers	Whalers Cove Lodge
Karen Jeffman	The Wilderness Society
John Schoen	The Wildlife Society
	City of Wrangell
James E. Gove	City of Wrangell
	Wrangell Sentinel
Rush Duncan	Wrangell Forest Products
Michael Lockabey	Wrangell Advisory Committee
Ronald M. Gelbrich	Wrangell Forest Products
	Yak-Tat Kwann, Inc.
Cheryl Esferwood	City of Yakutat Annette Anderson
Sandra L. Anderson	
Bruce Bachen	
Richard Baker	
Astrid Bethers	
Bruce Blake	
Arthur Bloom	
Floyd Branson	
Steve Brenner	
Royal Breseman	
Phil Briggs	
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Christopher Carroll	
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Helen Clough	



## 6 List of Agencies, Organizations, and Persons to Whom Copies of this Statement Were Sent

Name	Organization
Dr. Henry Cole	
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David Duffey	
Helen M. Drury	
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Joe Geldhof	
Virgil & Jean Gile	
Norma Goodman	
Richard Gordon	
Richard Hacker	
Kenneth Hammons	
Dave Hardy	
E.J. Haugen	
Jake Hess	
Amy & Charlie Hodgson	
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Thomas E. Jacobsen, DDS	
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Molly Kemp	
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## List of Agencies, Organizations, and Persons to Whom Copies of this Statement Were Sent **6**

Name	Organization
Mark J. Kirchhoff	
K. & M. Leccese	
Max M. Lewis	
Cliff Lobaugh	
Enid & Fred Magill	
Craig Mapes	
Karin McCullough	
Mark Meeks	
Honorable Frank Murkowski	
Michael Nelson	
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Gloria Ohmer	
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Gloria Ohmer	
Sig Olson	
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Tom Paul	
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G. H. Reifenstein Jr	
Carl Reller	
Steve Rentenstihl	
Chuck Rice	
N.J. Richards	
Irene Roundtree	
Gail Sage	
Edward Sargent,MD	
Lee Schmidt	
John Schulz	
Carolyn Servid	
John Shelton	
Jeff Sloss	
Robert Smith	
Lin Sonnenberg	
Richard Sprague	
Honorable Ted Stevens	

## 6 List of Agencies, Organizations, and Persons to Whom Copies of this Statement Were Sent

Name	Organization
Bob Stredwick	
John Swanson	
Honorable Robin Taylor	
D. Thorington	
Richard Uberuaga	
Dave Waarvik	
Janet Wallin	
David E. Wallingruff	
Bella Watson	
S. M. Watson	
Susan Watson	
Hans F. Weinberg	
Ralph Wells	
Ron Welsh	
Bill Whitman	
William Williamson	
Syd Wright	
Henry Wojtusik	
Rollin Young	
Ron Zobel	



# **Chapter 7**

## **Literature Cited**



# Chapter 7

## Literature Cited

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# **Chapter 8**

## **Glossary**





# Chapter 8

## Glossary

### Acronyms used in text:

ACMP	Alaska Coastal Management Program
ADF&G	Alaska Department of Fish and Game
AHMU	Aquatic Habitat Management Unit
ALP	Alaska Lumber and Pulp Corporation
ANCSA	Alaska Native Claims Settlement Act
ANILCA	Alaska National Interest Lands Conservation Act
APC	Alaska Pulp Corporation
ASQ	Allowable Sale Quantity
BMP	Best Management Practices
CFL	Commercial Forest Land
CZMA	Coastal Zone Management Act
DEIS	Draft Environmental Impact Statement
EVC	Existing Visual Condition
FEIS	Final Environmental Impact Statement
IDT	Interdisciplinary Team
LOD	Large Organic Debris
LTF	Log Transfer Facility
LUD	Land Use Designation
MAI	Mean Annual Increment
MBF	One thousand board feet
MMBF	One million board feet
MELP	Multi-Entry Layout Process
NEPA	National Environmental Policy Act
NFMA	National Forest Management Act
NOI	Notice of Intent
NRHP	National Register of Historic Places
ROD	Record of Decision
ROS	Recreation Opportunity Spectrum
RPA	Forest and Rangeland Renewable Resources Planning Act
SEIS	Supplemental Environmental Impact Statement
SHPO	State Historic Preservation Officer
TLMP	Tongass Land Management Plan
TRUCS	Tongass Resource Use Cooperative Study
TTF	Terminal Transportation Facility (equivalent to LTF)
TTSF	Tongass Timber Supply Fund
VCU	Value Comparison Unit
VQO	Visual Quality Objective

**Terms used in text:**

***Adjacent Harvest***

Used to indicate when activity is projected to occur near the upper banks of an active stream bank.

***Aerial Harvest Systems***

Harvesting methods in which the cut logs are moved from the stump to the loading area or log deck without touching the ground. Examples are helicopter and balloon logging.

***Age Class Diversity***

The amount of age class distribution within a stand. Stands with low age class diversity would be composed of trees of approximately the same age, while stands with high age class diversity would contain trees of many ages.

***Alaska Lumber and Pulp Corporation***

Now named Alaska Pulp Corporation (APC).

***Alaska National Interest Lands Conservation Act (ANILCA)***

Passed by Congress in 1980, this legislation designated 14 national forest wilderness areas in Southeast Alaska. In section 705(a) Congress directed that at least \$40,000,000 be made available annually to the Tongass Timber Supply Fund to maintain the timber supply from the Tongass National Forest at a rate of 4.5 billion board feet per decade. Section 810 requires evaluations of subsistence impacts before changing the use of these lands.

***Alaska Native Claims Settlement Act (ANCSA)***

Approved December 18, 1971, ANCSA provides for the settlement of certain land claims of Alaska natives and for other purposes.

***Alaska Pulp Corporation (APC)***

Previously Alaska Lumber and Pulp Corporation.

***Allocation***

Commitment of a parcel of land to one or more kinds of use. Constraints limit the uses of a given parcel to less than the full set of land management options. Land allocations are made in TLMP.

***Allowable Sale Quantity (ASQ)***

ASQ refers to the maximum quantity of timber that may be sold each decade from the Tongass National Forest. This quantity, expressed as a board foot measure, is calculated per timber utilization standards specified in the Alaska Regional Guide, the number and type of acres available for timber management, and the intensity of timber management. The ASQ was calculated at 4.5 billion board feet per decade for the Tongass National Forest.

***Alpine Zones***

The region found on a mountain peak above the tree line.

***Anadromous Fish***

Anadromous fish (such as salmon, steelhead, and shad) spend part of their lives in freshwater and part of their lives in saltwater.

***Analysis Area***

An analysis area is a planning unit made up of two or more management areas identified in the Tongass Land Management Plan. This grouping of management areas is consistent with the area analysis direction found in the 1985-86 Tongass Land Management Plan Amendment and with the scope of the Supplement project.

***APC Contract Area***

Those portions of Baranof, Chichagof, and Kuiu Islands shown on Figures 1-2 and 1-3 in the Final SEIS.

***Appraisal***

See Timber Appraisal.

***Aquatic Habitat Management Unit (AHMU)***

A mapping unit that displays an identified value for aquatic resources. It is a mechanism for carrying out aquatic resource management policy.

*Class I AHMU:* Streams with anadromous or high quality sport fish habitat. Also included is the habitat upstream from a migration barrier known to have reasonable enhancement opportunities for anadromous fish.

*Class II AHMU:* Streams with resident fish populations and generally steep (6 to 15 percent) gradient (can also include streams from 0 to 6 percent gradient where no anadromous fish occur). These populations have limited sport fisheries values and are separate from the high quality sport fishing systems included in Class I. They generally occur upstream of migration barriers or are steep gradient streams with other habitat features that preclude anadromous fish use.

*Class III AHMU:* Streams with no fish populations but have potential water quality influence on the downstream aquatic habitat.

***Beach Fringe Habitat***

Forested habitat that occurs from the intertidal zone inland 600 feet, and islands of less than 50 acres. Beach fringe habitat is an emphasis habitat.

***Benthic Habitat***

Refers to the substrate and organisms on the bottom of marine environments.

***Best Management Practice***

A practice or combination of practices that, after problem assessment, examination of alternative practices, and appropriate public participation, is determined by a state to be the most effective and practicable means of preventing or reducing the amount of pollution generated by nonpoint sources to a level compatible with water quality goals. A BMP is not a site-specific prescription, but an action -initiating mechanism which eventually leads to the interdisciplinary development of a site-specific prescription.

***Broadcast Burning***

Burning of an area that has been clearcut to remove logging slash from the site. Broadcast burning is done to prepare sites for regeneration or improve wildlife habitat.

***Cant***

A log partly or wholly cut and destined for further processing.

***Capability***

An evaluation of a resource's inherent potential for use.

***Carryover***

Timber volume designated for harvest in a five-year Operating Period, but not harvested during that period. It is, therefore, available for subsequent five-year Operating Periods.



### ***Clearcut***

A method of regeneration cutting in which the old crop is completely cut in designated patches. Regeneration in the Alaska Region is usually natural; and the size of the clearcut area rarely exceeds 100 acres.

### ***Climax Forest***

A forest in which the species composition and condition of the stand is stable. This is the last stage of succession and does not change if the environment remains unchanged.

### ***Commercial Fishery***

Fish, shellfish, or other fishery resources taken or possessed within a designated area for commercial purposes.

### ***Commercial Forest Land (CFL)***

Productive forest land that is producing or capable of producing crops of industrial wood and is not withdrawn from timber utilization by statute or administrative regulation. This includes areas suitable for management and generally capable of producing in excess of 20 cubic feet per acre of annual growth or in excess of 8,000 board feet net volume per acre. It includes accessible and inaccessible areas.

*Normal CFL:* Timber that can be economically harvested with locally available logging systems. Composed of two categories:

*Standard:* Timber that can be economically harvested with locally available logging systems, such as highlead or short-span skyline.

*Special:* Timber that is in areas where special consideration is needed to protect other resources but can be harvested with locally available logging systems.

*Nonstandard CFL:* Timber that cannot be harvested with locally available logging systems and would require the use of other logging systems, such as helicopter or long-span skyline.

### ***Conveyance***

The passing of the title of a property from one owner to another.

### ***Cruise***

Refers to the general activity, as opposed to a specific method, of determining timber volumes and quality.

### ***Cultural Resources***

Historic or prehistoric objects, sites, buildings, structures, and so on that result from past human activities.

### ***Cumulative Effects***

Cumulative effects are the impacts on the environment resulting from the addition of the incremental impacts of past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such actions. Cumulative impacts can result from individually minor, but collectively significant, actions occurring over time.

### ***Cutover***

Areas harvested recently.

### ***Deer Winter Range***

A combination of environmental elements that support Sitka black-tailed deer under moderately severe or severe winter conditions. Deer winter range is an emphasis habitat.

***Deferred VCUs***

A deferred VCU is one in which further road construction and/or timber harvest would be deferred until the Supplement document is completed as required by the Court. The Notice of Intent lists all deferred VCUs.

***Direct Employment***

The jobs that are immediately associated with the Long-Term Contract timber sale, including, for example, logging, sawmills, and pulpmills.

***Dispersed Recreation***

Recreational activities that are not confined to a specific place.

***Draft Environmental Impact Statement***

Section 102 of the National Environmental Policy Act (NEPA) requires that a statement of environmental effects for a major Federal action be released to the public and other agencies for comment and review prior to a final management decision.

***Eagle Nest Tree Buffer Zone***

A 330-foot radius around eagle nest trees established in a Memorandum of Understanding between the US Fish and Wildlife Service and the Forest Service.

***Emphasis Habitats***

Wildlife habitats identified in the 1986-90 EIS to address wildlife issues relating to timber harvest activities. Those habitats include: deer winter range, inland wetland, beach fringe, estuarine fringe, and streamside riparian.

***Emphasis Species***

The following categories were used where appropriate: endangered and threatened plant and animal species identified on State and Federal lists; species with special habitat needs that may be influenced significantly by planned management programs; species commonly hunted, fished, or trapped; nongame species of special interest; additional plant or animals selected because their population changes are believed to indicate effects of management activities on other species of a major biological community or on water quality.

***Entry***

Harvest of a specific portion of the total rotational volume.

***Estuarine Fringe Habitat***

A 1,000-foot timbered zone around an estuary. Estuarine fringe is an emphasis habitat.

***Estuary***

For the purpose of this EIS process, estuary refers to the relatively flat, intertidal, and upland areas generally found at the heads of bays and mouths of streams. They are predominantly mud and grass flats and are unforested except for scattered spruce or cottonwood.

***Evaluation Criteria***

Predetermined criteria for evaluating alternatives or options.

### ***Existing Visual Condition (EVC)***

The level of visual quality or condition presently occurring on the ground. The six existing visual condition categories are:

*Type I:* These areas appear to be untouched by human activities.

*Type II:* Areas in which changes in the landscape are not noticed by the average person unless pointed out.

*Type III:* Areas in which changes in the landscape are noticed by the average person, but they do not attract attention. The natural appearance of the landscape still remains dominant.

*Type IV:* Areas in which changes in the landscape are easily noticed by the average person and may attract some attention. Although the change in landscape is noticeable, it may resemble a natural disturbance.

*Type V:* Areas in which changes in the landscape are obvious to the average person. These changes appear to be major disturbances.

*Type VI:* Areas in which changes in the landscape are in glaring contrast to the natural landscape. The changes appear to be a drastic disturbance.

### ***Feasibility***

The opportunity for cost-effective harvest and transportation of timber.

### ***Fish Habitat***

The aquatic environment and the immediately surrounding terrestrial environment that, combined, afford the necessary physical and biological support systems required by fish species during various life stages.

### ***Floodplain***

The lowland and relatively flat areas joining inland and coastal waters, including debris cones and flood-prone areas of offshore islands; including, at a minimum, that area subject to a 1 percent (100-year recurrence) or greater chance of flooding in any given year.

### ***Forest and Rangeland Renewable Resources Planning Act of 1974. (RPA)***

Amended in 1976 by the National Forest Management Act.

### ***Forested Habitat***

All areas with forest cover. Used in this final EIS to represent a general habitat zone.

### ***Grabinski***

A modified highlead cable logging system.

### ***Habitat Capability***

The number of healthy animals that a habitat can sustain. In the Supplement, this term refers to Sitka black-tailed deer and pine marten in all Analysis Areas, and to Sitka black-tailed deer, pine marten, and brown bear in Analysis Areas 2, 3, and 6.

### ***Habitat Improvement***

Management of wildlife and fish habitats to increase their capability.

### ***Highlead Cable Logging***

A method of transporting logs to a collecting point by using a power cable passing through a block fastened off the ground to lift the front ends of the logs clear off the ground while in transit.



***Important Subsistence Use Area***

Important Subsistence Use Areas include the “most reliable” and “most often hunted” categories from the TRUCS survey and from subsistence survey data from ADF&G, the University of Alaska, and the Forest Service, Region 10. Important use areas include both intensive and extensive use areas for subsistence harvest of deer, furbearers, and salmon.

***Indirect Employment***

The jobs in service industries that are associated with the Long-Term Contract timber sale including, for example, suppliers of logging and milling equipment.

***Induced Employment***

The jobs in the service or governmental sectors that result from increased population or purchases associated with the Long-Term Contract timber sale; includes, for example, restaurant employment.

***Inland Wetland Habitat***

Lakes, beaver ponds, marsh lands, and associated grass/sedge meadows greater than 10 acres, plus a 500-foot buffer.

***Inoperable Timber***

Timber that cannot be harvested by any proven method because of potential resource damage, extremely adverse economic considerations, or physical limitations.

***Interdisciplinary Team (IDT)***

A group of people with different backgrounds assembled to solve a problem or perform a task.

***Land Use Designation (LUD)***

The method of classifying land uses presented in the Tongass Land Management Plan (TLMP). Land uses and activities are grouped to define, along with a set of coordinating policies, a compatible combination of management activities. The following is a description of the four classifications:

*LUD I:* Wilderness areas.

*LUD II:* These lands are to be managed in a roadless state in order to retain their wildland character, but this designation would permit wildlife and fish habitat improvement, as well as primitive recreation facility and road development under special authorization.

*LUD III:* These lands may be managed for a variety of uses. The emphasis is on managing for uses and activities in a compatible and complimentary manner to provide the greatest combination of benefits.

*LUD IV:* These lands provide opportunities for intensive resource use and development, where the emphasis is primarily on commodity or market resources.

***Large Organic Debris (LOD)***

Any large piece of relatively stable woody material having a least diameter of greater than 10 centimeters and a length greater than one meter that intrudes into the stream channel.

***Layout***

Planning and mapping (using aerial photos) of harvest and road systems needed for total harvest of a given area.

***Log Transfer Facility (LTF)***

A facility that is used for transferring commercially harvested logs to and from a vessel or log raft, or the formation of a log raft. It is wholly or partially constructed in waters of the United States and siting and construction are regulated by the 1987 Amendments to the Clean Water Act. Formerly termed terminal transfer facility.

***Logging Camp***

A temporary facility established to house industry and Forest Service personnel while timber harvest occurs in the area.

***Logistical Constraints***

The short time frame during which the SEIS alternatives could be implemented (before December 31, 1990) causes limitations on the accessibility of harvest areas. The length of time required to acquire permits to construct a log transfer facility, the time required to construct a road, or the time needed to harvest the timber may not fit within the SEIS time frame.

***Management Area***

An area one or more VCUs in size for which management direction was written in the Tongass Land Management Plan. All or portions of 13 Management Areas are included in the 1986-90 Study Area.

***Marginal***

Commercial forest land areas that do not qualify as standard or special CFL since they are not operable under short-term (ten years or less) projections of accessibility and economic conditions.

***Mass Failure***

The downslope movement of a block or mass of soil. This usually occurs under conditions of high soil moisture, and does not include individual soil particles displaced as surface erosion.

***Mean Annual Increment***

The total volume of a tree or stand divided by the stand age. The volume may be expressed in cubic feet or board feet per year.

***Memorandum and Order***

Refers to the Memorandum and Order in the case of *Tenakee Springs v. Courtright*, No. J86-024 Civil (D. Alaska) Game Creek signed June 24, 1987 and the Memorandum and Order on Port Camden Road/East Kuiu Management Area in the case of *Tenakee Springs v. Courtright*, No. J86-024 Civil (D. Alaska) Threemile Arm, signed July 31, 1987. Both Memoranda and Orders were signed by James A. von der Heydt, United States District Court Judge for the State of Alaska. Also refers to the Memorandum and Order in the case of *Hanlon v. Barton*, No. J88-025 (District of Alaska) signed November 14, 1988 by J. A. von der Heydt.

***Mitigation***

These measures include avoiding an impact by not taking a certain action or part of an action; minimizing an impact by limiting the degree or magnitude of an action and its implementation; rectifying the impact by repairing, rehabilitating, or restoring the affected environment; reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; or compensating for the impact by replacing or providing substitute resources or environments.

### ***Multi-Entry Layout Process***

Computerized database located in each area supervisor's office containing information on timber and transportation and TLMP management goals. It is used for planning and economic analyses for the Forest Service administrative area.

### ***National Environmental Policy Act (NEPA)***

Passed by Congress in 1969, NEPA declared a national policy to encourage productive harmony between humans and their environment, to promote efforts that will prevent or eliminate damage to the environment and the biosphere and stimulate the health and welfare of humans, to enrich the understanding of the ecological systems and natural resources important to the nation, and to establish a Council on Environmental Quality. This act requires the preparation of environmental impact statements for federal actions that are determined to be of major significance.

### ***National Forest Management Act (NFMA)***

A law passed in 1976 that amends the Forest and Rangeland Renewable Resources Planning Act and requires the preparation of Forest plans.

### ***National Register of Historic Places (NRHP)***

Official catalogue of cultural resources that are significant in American history, prehistory, architecture, engineering, and culture; maintained by the U.S. Department of the Interior.

### ***Native Allotment***

A tract of non-mineral land, not to exceed 160 acres, on which an Alaskan Native (who was 21 years of age or head of a household) established continuous use and occupancy prior to the creation of the National Forests (authorized under the Native Allotment Act of May 17, 1906).

### ***Native Selection***

A tract of land on which an Alaska Native, Native group, Village Corporation, or Regional Corporation has made application for ownership as authorized under Sections 12, 14, and 16 of Alaska Native Claims Settlement Act (ANCSA) and as amended by Titles IX and XIV of Alaska National Interest Lands Conservation Act (ANILCA).

### ***Noncommercial Forest Land***

Land with more than 10 percent cover of commercial tree species, but not qualifying as commercial forest land.

### ***Nondeferred VCUs***

Interim operating areas where scheduled timber harvesting and road construction may take place without further NEPA analysis, as directed by a court-approved settlement and the Notice of Intent.

### ***Nonforest Land***

Land that has never supported forests and lands formerly forested but now developed for nonforest uses or land with less than 10 percent cover of commercial tree species.

### ***Nonstandard Harvest Operability***

Timber that cannot be harvested with standard equipment and techniques but that would require other systems including balloon, helicopter, or skyline over 2,600 feet, as defined in the TLMP.

### ***Nonstandard Logging Systems***

These systems are not in predominant use on the Tongass National Forest. Nonstandard systems include multi-span skyline, long single span skylines (skylines with a reach over 2600 feet), and helicopters.



### ***Normal Harvest Operability***

Timber that can be harvested with currently employed standard equipment and predominant techniques such as highlead, A-frame, skyline of less than 2600 feet, and tractor. This is defined as TLMP Operability Class 1.

### ***Notice of Intent (NOI)***

Notice of Intent was submitted to indicate an intention to produce an EIS Supplement to the 1981-86 and 1986-90 Operating Plan Environmental Impact Statements for the Alaska Pulp Corporation. The NOI was signed on September 30, 1987.

### ***Old-Growth Forest***

Old-growth stands are characterized by trees well past the age of maturity (dominant trees exceed 300 years in age). Stands exhibit declining growth rates and signs of decadence, such as dead and dying trees, snags, and downed woody material. Stands include trees of all ages, multilayered canopies, a range of tree diameter sizes (including very large diameter trees, up to and exceeding 3 meters), and the notable presence of understory vegetation. Old growth stands are defined in the TLMP inventory as those stands having the majority of timber volume in trees more than 150 years of age.

### ***Old-Growth Habitat***

Lands identified during the 1986-90 plan process and prescribed for continued management to maintain old-growth forest characteristics through the planning period, subject to further planning and NEPA disclosure.

### ***Operability***

Timber suitable for harvest and transport to a market. See inoperable, nonstandard, and normal harvest operability.

### ***Overstory***

In a stand with several vegetative layers, the overstory is the uppermost layer, usually formed by the tallest trees.

### ***Planning Record***

This is a detailed, formal account of the planning process for the Supplemental EISs. The record contains many forms of data, maps, reports, planning process information, and results of public participation in the planning process. The record provides the basis for the development of the environmental impact statement. For this supplement, the planning record is collectively located at Tongass National Forest field offices in Petersburg, Sitka, and Hoonah, as well as the regional office in Juneau, Alaska.

### ***Potential Yield***

The potential yield for the next ten years is the maximum harvest that is possible given the optimum perpetual sustained-yield harvesting level attainable with intensive forestry on regulated areas and considering productivity of the land, conventional logging technology, standard silvicultural treatments, and relationships with other resource uses and the environment.

### ***Precommercial Thinning***

The practice of removing some of the trees of less than marketable size from a stand in order to achieve various management objectives.

### ***Prescriptions***

A set of treatments or practices designed to develop and/or protect some combination of resources.

### ***Recreation Opportunity Spectrum (ROS)***

The framework for planning and managing the recreation resource that consists of six classes from primitive to urban. Each ROS class is defined in terms of its setting and the recreational experiences offered in that setting. Other factors, including the extent to which the natural environment has been modified, the type of facilities developed, and the degree of outdoor skills needed to enjoy the area also play a role in defining the ROS class.

*Primitive I:* Includes areas out of sight and sound of human activities and greater than 3 miles from roads open to public travel and marine travelways. Provides opportunities for a high degree of interaction with the natural environment, challenge, risk, and the use of outdoor skills.

*Primitive II:* Area is similar in appearance to Primitive I ROS class; however, is accessible by marine travelway or is within 1/4 mile of low use trails.

*Semi-Primitive Nonmotorized:* Includes areas greater than 1/4 mile and less than 3 miles from all roads, trails, or readily accessible marine travelways. Provides limited opportunities for isolation from the sights and sounds of humans and a high degree of interaction with the natural environment. Moderate challenge, risk, and the opportunity to use outdoor skills.

*Semi-Primitive Motorized:* Includes areas less than 1/4 mile from primitive roads, trails or readily accessible marine travelways. Characterized by a predominantly unmodified natural environment with minimum evidence of sights and sounds of humans. Road access is not maintained in these areas.

*Roaded Natural:* Areas are less than 1/4 mile from roads open to public travel, major power lines, and areas of timber harvest. Areas are characterized by predominantly natural environments with moderate evidence of sights and sounds of humans.

*Roaded Modified:* Areas are less than 1/4 mile from areas of timber harvest and transportation corridors. Areas are characterized by modified natural environment where utilization practices are common and are for purposes other than recreation.

*Rural:* Includes those areas with small communities, developed campgrounds, and administrative sites. These areas are characterized by substantially modified natural environments. Sights and sounds of humans are readily evident.

*Urban:* Areas characterized by substantially urbanized environment. The background may have elements of a natural environment. Timber harvest activities and utilization practices are common. Sights and sounds of humans predominant. Large numbers of visitors can be expected on site and in nearby areas.

### ***Resident Fish***

Fish that are not anadromous and that reside in fresh water on a permanent basis. Resident fish include non-anadromous dolly varden char and cutthroat trout.

### ***Retention Factor***

The amount of commercial forest land removed from the calculation of the ASQ as an allowance to protect other resource values. These factors are allowances available to draw upon when meeting other resource needs and are not fixed policies to be rigidly applied by the Interdisciplinary Team or Forest Supervisors.

### ***Right-of-Way***

The privilege that a person or persons may have of passing over another's land.

### ***Riparian***

Areas immediately adjacent to a body of water, the vegetation of which is usually influenced by the water.

***Roads, Collector***

This functional class of road serves moderate-sized areas and usually connects to a forest arterial or public highway. It collects traffic from forest local roads.

***Roads, Local***

This functional class of road provides access for a specific resource use activity, such as a timber sale or recreation site, although other minor uses may be served.

***Roads, Preplanned***

Roads planned in a prior EIS.

***Roads, Specified***

A road, including related transportation facilities and appurtenances, shown on the Sale Area Map and listed in the Timber Sale Contract.

***Roads, Temporary***

For National Forest timber sales, temporary roads are constructed to harvest timber on a one-time basis. These logging roads are not considered part of the permanent forest transportation network, and have stream crossing structures removed, erosion measures put into place, and the road closed to vehicular traffic after harvest is completed.

***ROD Postponed***

Timber harvest and/or road construction in VCUs that were postponed by the 1986-90 Record of Decision.

***Rotation***

The planned number of years (approximately 100 years in Alaska) between the time that a forest stand is regenerated and its next cutting at a specified stage of maturity.

***RPA***

Forest and Rangeland Renewable Resources Planning Act of 1974.

***Salvage Cutting***

Cutting primarily to utilize dead/down material resulting from windthrow and scattered poor risk trees that will not be marketable if left in the stand until the next scheduled harvest. Salvage sales must contain more than 50 percent by volume of dead, insect infested, or windthrown timber.

***Salvage Sale***

A timber sale to use dead and down timber and scattered poor-risk trees that would not be marketable if left in the stand until the next scheduled harvest.

***Sawlog***

A log considered suitable in size and quality for producing sawn lumber.

***Second-Growth Forest***

Even-aged stands that will grow back on a site after removal of the previous timber stand.

***Selective Cutting***

A harvest method in which only some of the trees are removed from the area at one time.



### ***Sensitivity Level***

The measure of people's concern for the scenic quality of the National Forests. In 1980, the Tongass National Forest assigned sensitivity levels to land areas viewed from boat routes and anchorages, plane routes, roads, trails, public use areas, and recreation cabins.

*Level 1:* Includes all seen areas from primary travel routes, use areas, and water bodies where at least three-fourths of the forest visitors have a major concern for scenic quality.

*Level 2:* Includes all seen areas from primary travel routes, use areas, and water bodies where at least one-fourth of the forest visitors have a major concern for scenic quality.

*Level 3:* Includes all seen areas from secondary travel routes, use areas, and water bodies where less than one-fourth of the forest visitors have a major concern for scenic quality.

### ***Shelterwood Cutting***

A harvest method in which most of the trees are removed in an initial entry, and some trees are left to naturally reseed the area and provide protection to new seedlings that establish on the site. A second entry is conducted later to remove the remaining trees.

### ***Silviculture***

Forest management practices that deal with the establishment, development, reproduction, and care of forest trees.

### ***Slash***

Debris left over after a logging operation, i.e., limbs, bark, broken pieces of logs.

### ***Soil Hazard Areas***

Mapped areas within which various soil hazards may be encountered. Hazards include mass failures and high sediment production during road construction.

### ***Spawning Area***

The available area in a stream course that is suitable for the deposition and incubation of salmon or trout eggs.

### ***Species Diversity***

The number of different species occurring in a location or under similar environmental conditions.

### ***Standard Logging Systems***

Referred to as normal logging systems in the Timber and Silviculture Resource Report. These systems include highlead, A-frame, single span skyline (skyline with a reach less than 2,600 feet), and tractor.

### ***State Historic Preservation Officer (SHPO)***

State appointed official who administers Federal and State programs for cultural resources.

### ***Streamside Riparian***

Forested areas within 500 feet of anadromous spawning areas.

### ***Study Area***

That portion of the sale area that was being studied for 1981-86 and 1986-90 Operating Periods.

### ***Stumpage***

The value of timber as it stands uncut in terms of dollar value per thousand board feet.

### ***Subsistence Use***

The term "subsistence use" means the customary and traditional uses by rural Alaskan residents of wild renewable resources for direct, personal, or family consumption as food, shelter, fuel, clothing, tools, or transportation; for the making and selling of handicraft articles out of nonedible byproducts of fish and wildlife resources taken for personal or family consumption; for barter, or sharing for personal or family consumption; and for customary trade.

### ***Successional Stage***

One stage in a series of changes affecting the development of a biotic community. On its path to a climax stage the community will pass through several stages of adaptation to environmental changes.

### ***Suitability***

An evaluation of a resource's potential for proposed management activities.

### ***Thousand Board Foot Measure***

A method of timber measurement in which the unit is equivalent to 1,000 square feet of lumber one inch thick. It can be abbreviated Mbd, Mbm, or MBF.

### ***Timber Appraisal***

Establishing the fair market value of timber by taking the selling value minus manufacturing costs, the cost of getting logs from the stump to the manufacturer, and an allowance for profit and risk.

### ***Timber Sale Contract***

Refers to the APC Long-Term Timber Sale Contract in the Supplemental EIS. The Timber Sale Contract is between the Alaska Pulp Corporation and the Forest Service, and is informally referred to by many as the 50-year Contract.

### ***Tongass Land Management Plan (TLMP)***

The 10-year land allocation plan for the Tongass National Forest that directs and coordinates planning and the daily uses and activities carried out within the forest. See also Land Use Designation.

### ***Tongass Resource Use Cooperative Study (TRUCS)***

A compilation of data on subsistence uses for evaluating the effects of the Forest Service's action contemplated in the revision of the regional Tongass Land Management Plan.

### ***Tongass Timber Supply Fund (TTSF)***

Money established by Congress in ANILCA to make available for harvest 4.5 billion board feet from the Tongass National Forest per decade. The money is used to provide access to marginal timber stands and to allow for protection of other resource values.

### ***Utility Logs***

Those logs that do not meet sawlog grade, but are suitable for production of firm useable pulp chips.

### ***Value Comparison Unit (VCU)***

These areas, which generally encompass a drainage basin, were established in the Tongass National Forest to provide a common set of areas where resource inventories could be conducted and resource interpretations made.

### ***Visual Quality Objectives (VQOs)***

Measurable standards reflecting five different degrees of landscape alteration based upon a landscape's diversity of natural features and the public's concern for high scenic quality. The five categories of VQOs are:

***Preservation:*** Permits ecological changes only. Applies to wilderness areas and other special classified areas.

***Retention:*** Provides for management activities that are not visually evident; requires reduction of contrast through mitigation measures either during or immediately after operation.

***Partial Retention:*** Management activities remain visually subordinate to the natural landscape. Mitigation measures should be accomplished within one year of project completion.

***Modification:*** Management activities may visually dominate the characteristics landscape. However, activities must borrow from naturally established form, line, color, and texture so that its visual characteristics resemble natural occurrences within the surrounding area when viewed in the middleground distance.

***Maximum Modification:*** Management activities may dominate the landscape. Mitigation measures should be accomplished with five years of project completion.

### ***Volume***

Stand volume based on standing net board feet per acre by Scribner Rule.

#### ***Volume Class***

Volume classes are used to describe the average volume of timber per acre in thousands of board feet (MBF). Following are the seven volume classes and the range of volume each contains.

***Volume Classes 1 to 3:*** Less than 8 MBF/acre (cleared land, seedlings, or pole timber stands).

***Volume Class 4:*** 8 to 20 MBF/acre.

***Volume Class 5:*** 20 to 30 MBF/acre.

***Volume Class 6:*** 30 to 50 MBF/acre.

***Volume Class 7:*** 50+ MBF/acre.

### ***V-notch***

A V-shaped stream channel generally on steep, mountainous terrain.

### ***Watershed***

The drainage area of a stream.

### ***Wetland***

Those areas that are inundated by surface or ground water frequently enough to support vegetation that requires saturated or seasonally saturated soil conditions for growth and reproduction.

### ***Wilderness***

An area established by the Federal Government and administered either by the Forest Service, National Park Service, Fish and Wildlife Service, or Bureau of Land Management in order to conserve its primeval character and influence for public enjoyment, under primitive conditions, in perpetuity.



***Wildlife Habitat***

The locality where a species may be found and where the essentials for its development and sustained existence are obtained.

***Wildlife Habitat Management Unit (WHMU)***

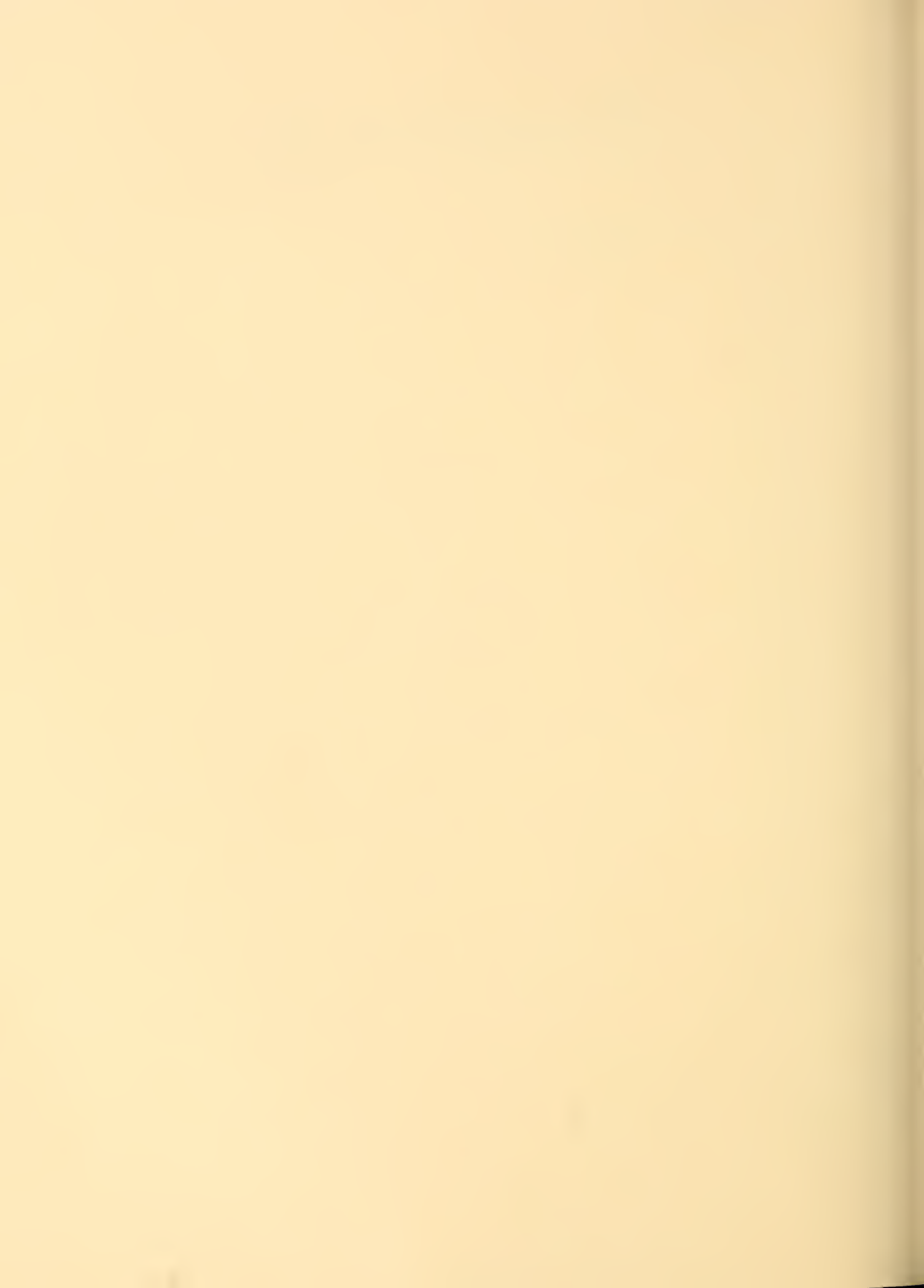
An area of wildlife habitat identified during the IDT process as having values important to wildlife.

***Windthrows***

Areas where trees are uprooted by the wind.

# Chapter 9

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# Chapter 9

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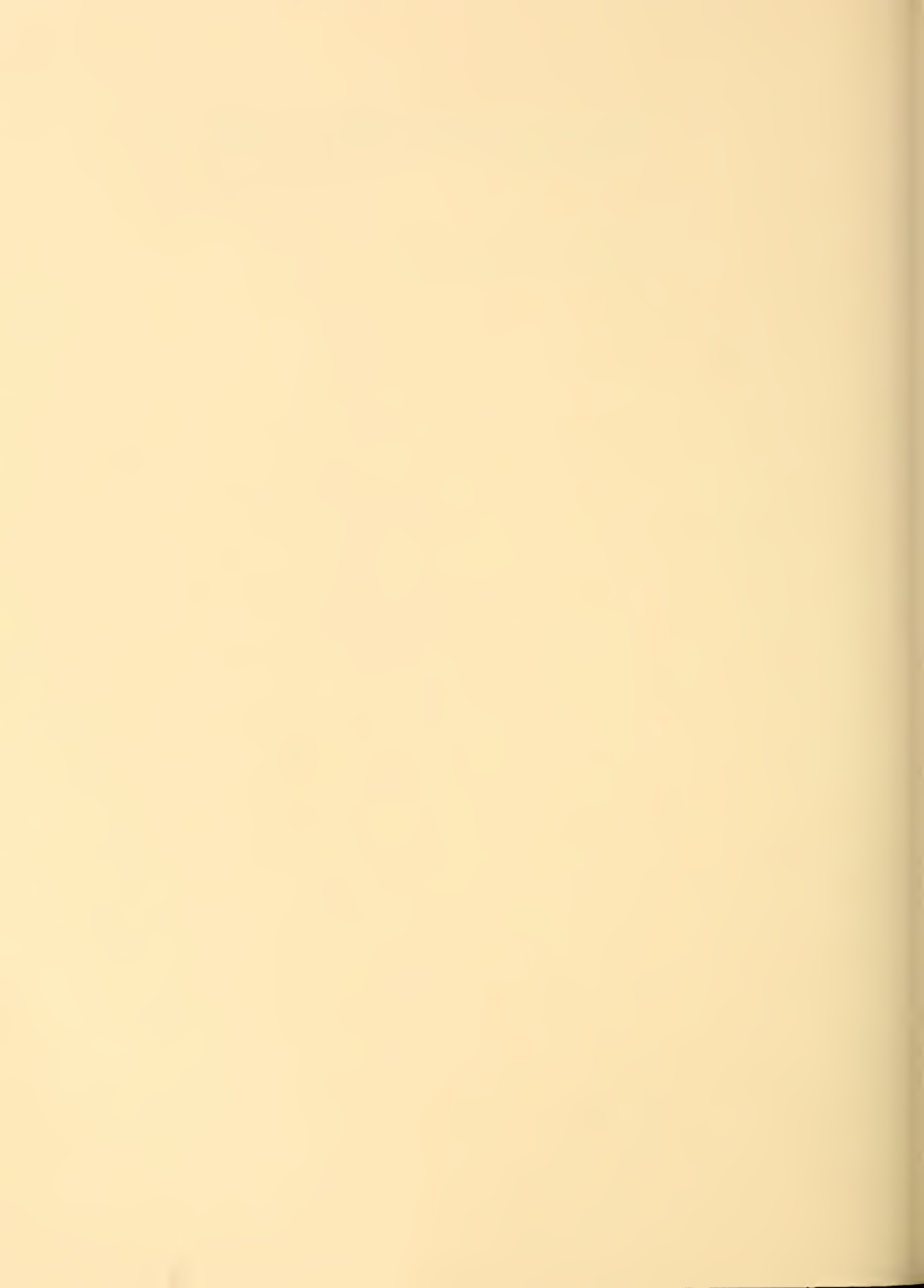
# Appendices



# **Appendix A-1**

## **Unit Cards**





APPENDIX A-1  
UNIT CARDS AND ROAD MANAGEMENT OBJECTIVES

This appendix contains copies of the harvest unit layout cards and the road location and construction recommendation cards. The purpose of these cards is to document design features and mitigation measures to guide project implementation.

Often, these design features and mitigation measures are based on inventory information from the Forest data base and from aerial photography interpretation. In some cases this information has also been verified on the ground. In addition to specifying design features and mitigation measures for each unit on the layout card, the resource specialist can indicate the desire to be involved in layout of the project. This provides the resource specialists with the opportunity to be involved in an on-going implementation and monitoring process. It is likely that the need for some modification of unit design may be identified during implementation. Process direction for changes in implementation are discussed in the Record of Decision for this SEIS.

Typed versions of the unit cards are included here to insure readability. The hand-written and initialed originals are available in the planning records at the Stikine Area Supervisor's Office in Petersburg.

## UNIT LAYOUT CARD

Card Type: I Planned 10/88 by R.H. Burke  
 (Circle) II Laid Out Date IDT Leader/Timber Rep.  
 III Modification Date by  
 Date

Sale Name APC SEIS  
 Unit No. 399-7  
 Acres 90  
 Vol/Acre 21.7 MBF  
 Total Vol 1,955 MBF  
 Alternative 2,3,4,5

Reviewed By \_\_\_\_\_ Date \_\_\_\_\_

Approved By \_\_\_\_\_ Date \_\_\_\_\_  
 District Ranger

VCU 399 \_\_\_\_\_ Compartment 3 \_\_\_\_\_ Stand Number(s) 99 \_\_\_\_\_

DATE & INITIALS	REMARKS	For Laid Out & Modified Units: Are the impacts of the unit different than those anticipated in the EIS? If yes, explain.
	Cultural	
	<input type="checkbox"/> N	
*	<input type="checkbox"/> Y	No cultural resource concerns
	Fisheries	
	<input type="checkbox"/> N	
*	<input type="checkbox"/> Y	No Class I or II AHMUs within or approaching unit. No direct effect on fish habitat.
	Lands	
	<input type="checkbox"/> N	
*	<input type="checkbox"/> Y	No concerns.
	Recreation	
	<input type="checkbox"/> N	
*	<input type="checkbox"/> Y	No anticipated impacts on known recreation places
	Silviculture (should be last to review)	
	<input type="checkbox"/> N	
*	<input type="checkbox"/> Y	Clearcut with natural regen and PCT.
X	Soils	
	<input type="checkbox"/> N	
*	<input type="checkbox"/> Y	No anticipated soils concerns
	Visual	
	<input type="checkbox"/> N	
*	<input type="checkbox"/> Y	Meets Assigned VQO of Maximum modification
	Water	
	<input type="checkbox"/> N	A high gradient channel follows the northern edge of the parcel. Sideslope protection is needed, possibly partial suspension.
*	<input type="checkbox"/> Y	
	Wildlife	
	<input type="checkbox"/> N	Impacts of the unit as planned are not different than those anticipated in the SEIS.
*	<input type="checkbox"/> Y	

\*For planned unit check box if you want to be notified when unit will be laid out

SA 1900-1



Layout considerations (windthrow,  
future settings, etc.)  
C. clauses (Independent Sales)

Date: 8-4-77 Flight Line: 8 Roll: 476 Print # 105




↑  
N  
True



Scale 1" = 1320'

Departures from original plan:

LEGEND

-  CUTTING BOUNDARY
-  SYSTEM ROAD
-  SPUR ROAD

## UNIT LAYOUT CARD

Card Type: I Planned 10/88 by R.H. Burke  
 (Circle) II Laid Out Date IDT Leader/Timber Rep.  
 III Modification Date by  
 Date

Sale Name APC SEIS  
 Unit No. 399-8  
 Acres 70  
 Vol/Acre 22.3 MBF  
 Total Vol 1,558 MBF  
 Alternative 2,3,4,5

Reviewed By \_\_\_\_\_ Date \_\_\_\_\_

Approved By \_\_\_\_\_ Date \_\_\_\_\_  
 District Ranger

VCU 399 \_\_\_\_\_ Compartment 3 \_\_\_\_\_ Stand Number(s) 166 \_\_\_\_\_

DATE & INITIALS	REMARKS	For Laid Out & Modified Units: Are the impacts of the unit different than those anticipated in the EIS? If yes, explain.
	Cultural	
	<input type="checkbox"/> N	
*	<input type="checkbox"/> Y	No cultural resource concerns
	Fisheries	
	<input type="checkbox"/> N	
*	<input type="checkbox"/> Y	No Class I or II AHMUs within or approaching unit. No direct effect on fish habitat.
	Lands	
	<input type="checkbox"/> N	
*	<input type="checkbox"/> Y	No concerns.
	Recreation	
	<input type="checkbox"/> N	
*	<input type="checkbox"/> Y	No anticipated impacts on known recreation places
	Silviculture (should be last to review)	
	<input type="checkbox"/> N	
*	<input type="checkbox"/> Y	Clearcut with partial suspension. Natural regen and PCT.
X	Soils	
	<input type="checkbox"/> N	Moderately high potential of landslide. Partial suspension required on entire unit.
*	<input type="checkbox"/> Y	
X	Visual	
	<input type="checkbox"/> N	
*	<input type="checkbox"/> Y	Meets Assigned VQO of Maximum modification
	Water	
	<input type="checkbox"/> N	Eastern edge of unit borders high gradient channel. Sideslope protection required; partial suspension.
*	<input type="checkbox"/> Y	
	Wildlife	
	<input type="checkbox"/> N	Impacts of the unit as planned are not different than those anticipated in the SEIS.
*	<input type="checkbox"/> Y	

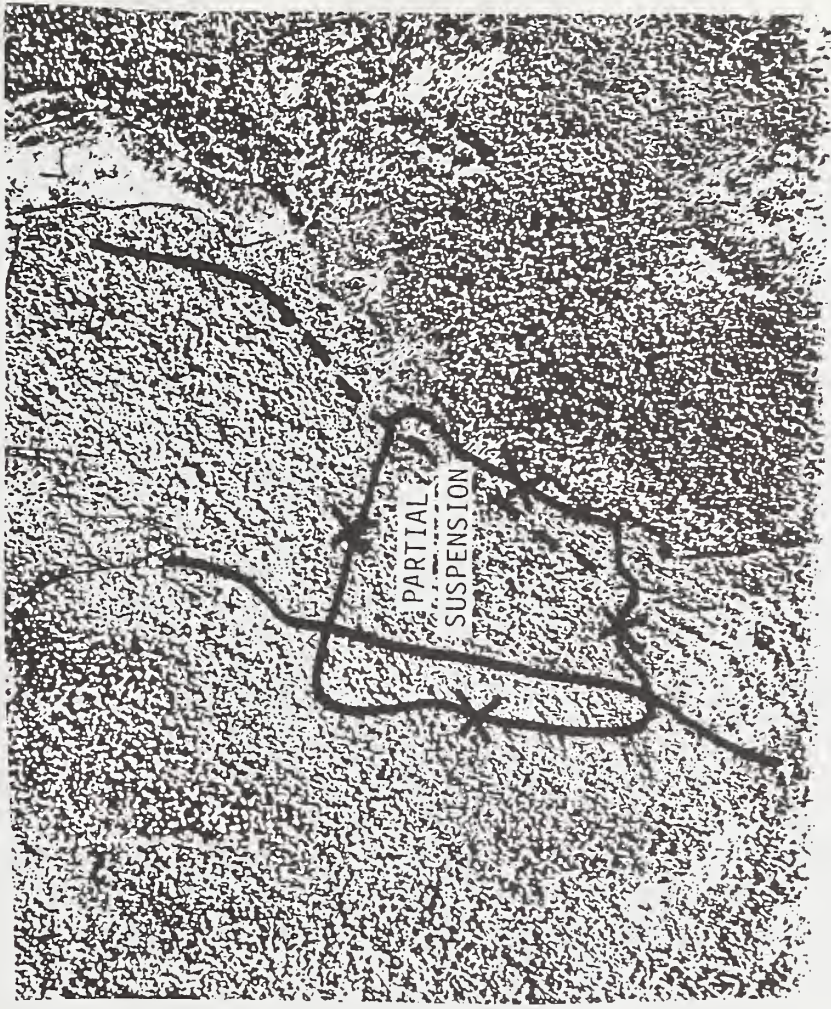
\*For planned unit check box if you want to be notified when unit will be laid out

SA 1900-1



Layout considerations (windthrow,  
future settings, etc.)  
C. clauses (Independent Sales)  
May not need lower road.

Date: 8-4-77 Flight Line: 8 Roll: 476 Print # 105



Departures from original plan:

- LEGEND
- CUTTING BOUNDARY
  - SYSTEM ROAD
  - SPUR ROAD

Scale 1" = 1320'



## UNIT LAYOUT CARD

Card Type: I Planned 10/88 by R.H. Burke  
 (Circle) Date IDT Leader/Timber Rep.  
 II Laid Out by  
 Date  
 III Modification by  
 Date

Sale Name APC SEIS  
 Unit No. 399-9  
 Acres 70  
 Vol/Acre 24.8 MBF  
 Total Vol 1,736 MBF  
 Alternative 2,3,4,5

Reviewed By \_\_\_\_\_ Date \_\_\_\_\_

Approved By \_\_\_\_\_ Date \_\_\_\_\_

District Ranger

VCU 399 \_\_\_\_\_ Compartment 3 \_\_\_\_\_ Stand Number(s) 116 \_\_\_\_\_

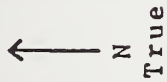
DATE & INITIALS	REMARKS	For Laid Out & Modified Units: Are the impacts of the unit different than those anticipated in the EIS? If yes, explain.
	Cultural	
	<input type="checkbox"/> N	
*	<input type="checkbox"/> No cultural resource concerns	
	<input type="checkbox"/> Y	
	Fisheries	
	<input type="checkbox"/> N	
*	<input type="checkbox"/> No Class I or II AHMUs within or approaching unit. No direct effect on fish habitat.	
	<input type="checkbox"/> Y	
	Lands	
	<input type="checkbox"/> N	
*	<input type="checkbox"/> No concerns.	
	<input type="checkbox"/> Y	
	Recreation	
	<input type="checkbox"/> N	
*	<input type="checkbox"/> No anticipated impacts on known recreation places	
	<input type="checkbox"/> Y	
	Silviculture (should be last to review)	
	<input type="checkbox"/> N	
*	<input type="checkbox"/> Clearcut with partial suspension. Natural regen and PCT when needed	
	<input checked="" type="checkbox"/> Y	
	Soils	
	<input type="checkbox"/> N	
*	<input type="checkbox"/> Moderately high potential for landslide. Unit is adjacent to natural landslide. Partial suspension required on entire unit.	
	<input checked="" type="checkbox"/> Y	
	Visual	
	<input type="checkbox"/> N	
*	<input type="checkbox"/> Meets Assigned VQO of Maximum modification	
	<input type="checkbox"/> Y	
	Water	
	<input type="checkbox"/> N	
*	<input type="checkbox"/> No mapped streams cross or directly border the unit. No anticipated water concerns.	
	<input type="checkbox"/> Y	
	Wildlife	
	<input type="checkbox"/> N	
*	<input type="checkbox"/> Impacts of the unit as planned are not different than those anticipated in the SEIS.	
	<input type="checkbox"/> Y	

\*For planned unit check box if you want to be notified when unit will be laid out

SA 1900-1

Layout considerations (windthrow,  
future settings, etc.)  
C. clauses (Independent Sales)

Date: 8-4-77 Flight Line: 8 Roll: 476 Print # 105



Departures from original plan:

Scale 1" = 1320'

LEGEND

- CUTTING BOUNDARY
- SYSTEM ROAD
- SPUR ROAD

## UNIT LAYOUT CARD

Card Type: I Planned 10/88 by R.H. Burke  
 (Circle) II Laid Out Date IDT Leader/Timber Rep.  
 III Modification Date by  
 Date

Sale Name APC SEIS  
 Unit No. 399-10  
 Acres 39  
 Vol/Acre 33.1 MBF  
 Total Vol 1,292 MBF  
 Alternative 4,5

Reviewed By \_\_\_\_\_ Date \_\_\_\_\_

Approved By \_\_\_\_\_ Date \_\_\_\_\_  
 District Ranger

VCU 399 Compartment 3 Stand Number(s) 115

DATE & INITIALS	REMARKS	For Laid Out & Modified Units: Are the impacts of the unit different than those anticipated in the EIS? If yes, explain.
	Cultural	
	<input type="checkbox"/> N	
*	<input type="checkbox"/> Y	No cultural resource concerns
	Fisheries	
	<input type="checkbox"/> N	
*	<input type="checkbox"/> Y	No Class I or II AHMUs within or approaching unit. No direct effect on fish habitat.
	Lands	
	<input type="checkbox"/> N	
*	<input type="checkbox"/> Y	No concerns.
	Recreation	
	<input type="checkbox"/> N	
*	<input type="checkbox"/> Y	No anticipated impacts on known recreation places
	Silviculture (should be last to review)	
	<input type="checkbox"/> N	
*	<input type="checkbox"/> Y	Clearcut with partial suspension. Natural regen and PCT when needed
X	Soils	
	<input type="checkbox"/> N	
*	<input type="checkbox"/> Y	Moderately high landslide potential. Partial suspension required on entire unit.
X	Visual	
	<input type="checkbox"/> N	
*	<input type="checkbox"/> Y	Meets Assigned VQO of Maximum modification
	Water	
	<input type="checkbox"/> N	No mapped streams cross or directly border the unit. No anticipated water concerns.
*	<input type="checkbox"/> Y	
	Wildlife	
	<input type="checkbox"/> N	Impacts of the unit as planned are not different than those anticipated in the SEIS.
*	<input type="checkbox"/> Y	

\*For planned unit check box if you want to be notified when unit will be laid out

SA 1900-1

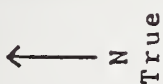


Layout considerations (windthrow,  
future settings, etc.)  
C. clauses (Independent Sales)

Departures from original plan:




Date: 8-4-77 Flight Line: 8 Roll: 476 Print # 106

Project Area Map



Scale 1" = 1320'

LEGEND

-  CUTTING BOUNDARY
-  SYSTEM ROAD
-  SPUR ROAD

## UNIT LAYOUT CARD

Card Type: I Planned 10/88 by R.H. Burke  
 (Circle) II Laid Out Date IDT Leader/Timber Rep.  
 III Modification Date by  
 Date

Sale Name APC SEIS  
 Unit No. 399-11  
 Acres 84  
 Vol/Acre 30.6 MBF  
 Total Vol 2,570 MBF  
 Alternative 4,5

Reviewed By \_\_\_\_\_ Date \_\_\_\_\_

Approved By \_\_\_\_\_ Date \_\_\_\_\_  
 District Ranger

VCU 399 Compartment 3 Stand Number(s) 109

DATE & INITIALS	REMARKS	For Laid Out & Modified Units: Are the impacts of the unit different than those anticipated in the EIS? If yes, explain.
	Cultural	
	N	
*	Y	No cultural resource concerns
	Fisheries	
	N	
*	Y	No Class I or II AHMUs within or approaching unit. No direct effect on fish habitat.
	Lands	
	N	
*	Y	No concerns.
	Recreation	
	N	
*	Y	No anticipated impacts on known recreation places
	Silviculture (should be last to review)	
	N	
*	Y	Clearcut with partial suspension. Natural regen and PCT when needed.
X	Soils	
	N	
*	Y	Moderate to high soil erosion potential. Partial suspension recommended on entire unit.
X	Visual	
	N	Unit will be visible from head of Saginaw Bay.
*	Y	Meets Assigned VQO of Maximum modification
	Water	
	N	No mapped streams cross or directly border the unit. No anticipated water concerns.
*	Y	
	Wildlife	
	N	Impacts of the unit as planned are not different than those anticipated in the SEIS.
*	Y	

\*For planned unit check box if you want to be notified when unit will be laid out

SA 1900-1

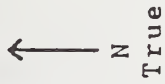


Unit Number 399-11

Layout considerations (windthrow,  
future settings, etc.)  
C. clauses (Independent Sales)

Project Area Map




Date: 8-4-77 Flight Line: 8 Roll: 476 Print # 106



Scale 1" = 1320'

Departures from original plan:

LEGEND

-  CUTTING BOUNDARY
-  SYSTEM ROAD
-  SPUR ROAD



## UNIT LAYOUT CARD

Card Type: I Planned 10/88 by R.H. Burke  
 (Circle) II Laid Out Date IDT Leader/Timber Rep.  
 III Modification Date by  
 Date

Sale Name APC SEIS  
 Unit No. 399-12  
 Acres 85  
 Vol/Acre 24.8 MBF  
 Total Vol 2,108 MBF  
 Alternative 2,3,4,5

Reviewed By \_\_\_\_\_ Date \_\_\_\_\_

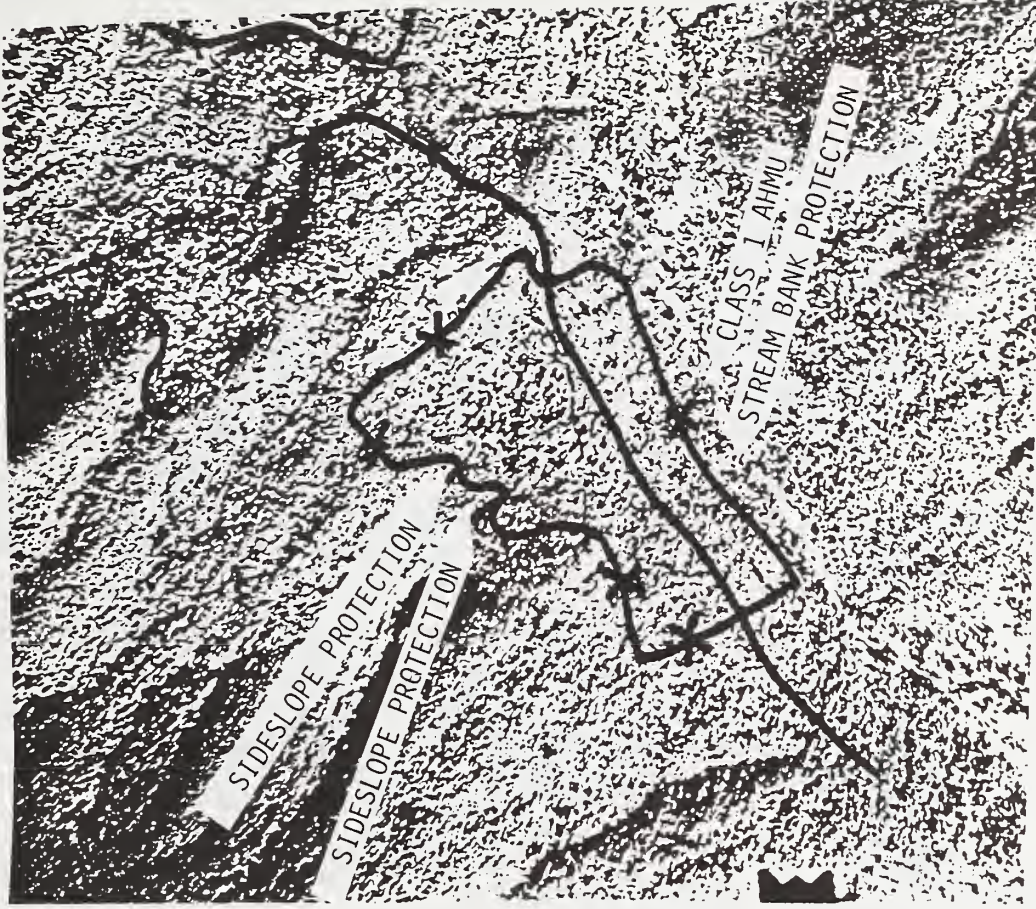
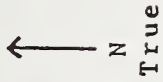
Approved By \_\_\_\_\_ Date \_\_\_\_\_  
 District Ranger

VCU 399 \_\_\_\_\_ Compartment 3 \_\_\_\_\_ Stand Number(s) 116 \_\_\_\_\_

DATE & INITIALS	REMARKS	For Laid Out & Modified Units: Are the impacts of the unit different than those anticipated in the EIS? If yes, explain.
	Cultural	
	<input type="checkbox"/> N	
*	<input type="checkbox"/> Y	No cultural resource concerns
	Fisheries	
	<input type="checkbox"/> N	Apply Class I AHMU prescriptions within approximately 100 feet of Class I stream on SE side of unit. Maintaining a wind firm buffer
*	<input checked="" type="checkbox"/> Y	will protect stream habitat.
	Lands	
	<input type="checkbox"/> N	
*	<input type="checkbox"/> Y	No concerns.
	Recreation	
	<input type="checkbox"/> N	
*	<input type="checkbox"/> Y	No anticipated impacts on known recreation places
	Silviculture (should be last to review)	
	<input type="checkbox"/> N	
*	<input type="checkbox"/> Y	Clearcut with natural regen and PCT.
	Soils	
	<input type="checkbox"/> N	
*	<input type="checkbox"/> Y	No anticipated soils concerns
	Visual	
	<input type="checkbox"/> N	
*	<input type="checkbox"/> Y	Meets Assigned VQO of Maximum modification
	Water	Two high gradient channels cross through unit. Sideslope protection is needed; possibly split line. The SE edge of the unit borders a low gradient channel. Streambank protection is needed to ensure future LOD and minimize instability.
	<input type="checkbox"/> N	
*	<input type="checkbox"/> Y	
	Wildlife	
	<input type="checkbox"/> N	Impacts of the unit as planned are not different than those anticipated in the SEIS. Application of AHMU prescriptions will mitigate riparian habitat concerns.
*	<input type="checkbox"/> Y	

Layout considerations (windthrow,  
future settings, etc.)  
C. clauses (Independent Sales)

Date: 8-4-77 Flight Line: 9 Roll: 676 Print # 149



Scale 1" = 1320'

Departures from original plan:

LEGEND

- CUTTING BOUNDARY
- SYSTEM ROAD
- SPUR ROAD

## UNIT LAYOUT CARD

Card Type: I Planned 10/88 by R.H. Burke  
 (Circle) Date IDT Leader/Timber Rep.  
 II Laid Out by  
 Date  
 III Modification by  
 Date

Sale Name APC SEIS  
 Unit No. 400-2  
 Acres 20  
 Vol/Acre 24.8 MBF  
 Total Vol 496 MBF  
 Alternative 2,3,4

Reviewed By \_\_\_\_\_ Date \_\_\_\_\_  
 Approved By \_\_\_\_\_ Date \_\_\_\_\_  
 District Ranger

VCU 400 Compartment 2 Stand Number(s) 131

DATE & INITIALS	REMARKS	For Laid Out & Modified Units: Are the impacts of the unit different than those anticipated in the EIS? If yes, explain.
	Cultural	
*	N	No cultural resource concerns.
	Y	
	Fisheries	
*	N	No Class I or II AHMUs within or approaching unit. No direct effect on fish habitat.
	Y	
	Lands	
*	N	No concerns.
	Y	
	Recreation	
*	N	No anticipated impacts to "recreation places".
	Y	
	Silviculture (should be last to review)	
*	N	Clearcut with natural regeneration and PCT.
X	Y	
	Soils	
*	N	No apparent soil management problems.
	Y	
	Visual	
*	N	Unit will meet VQO of Modification. Removes harsh edge of existing clearcut.
	Y	
	Water	
*	N	No mapped streams cross or directly border the unit. No anticipated water concerns.
	Y	
	Wildlife	
*	N	Impacts of the unit as planned are not different than those anticipated in the SEIS. No additional mitigation needed.
	Y	

\*For planned unit check box if you want to be notified when unit will be laid out

SA 1900-1  
 (Rev. 3/88)

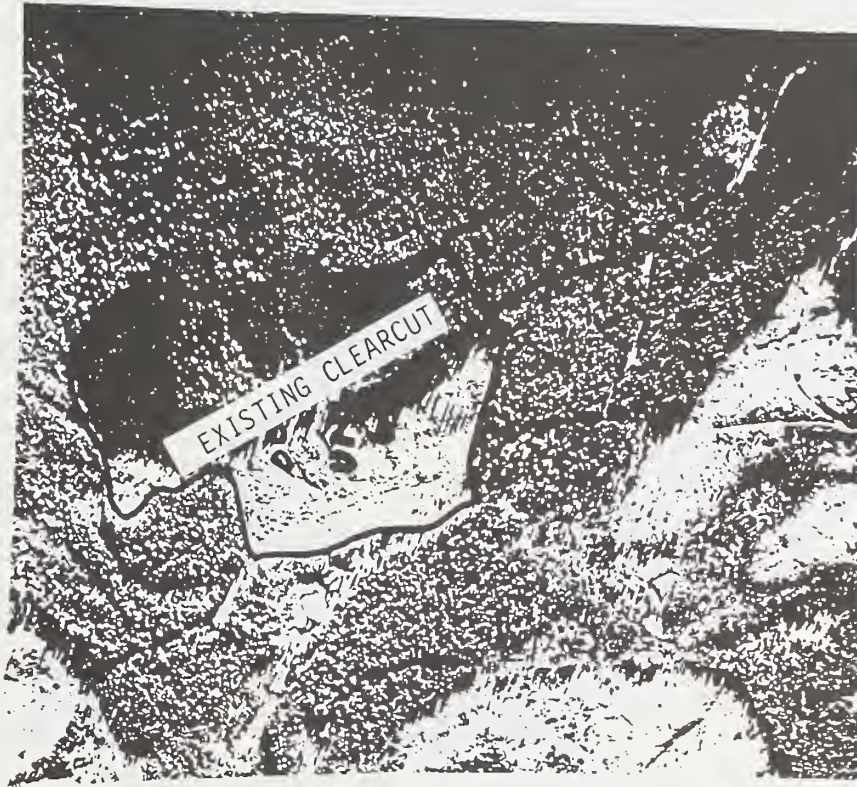
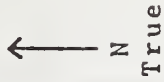


Layout considerations (windthrow,  
future settings, etc.)  
C. clauses (Independent Sales)

Date: 8-4-77 Flight Line: 4

Roll: 376

Print # 28



Departures from original plan:

LEGEND

- CUTTING BOUNDARY
- SYSTEM ROAD
- SPUR ROAD

Scale 1" = 1320'

## UNIT LAYOUT CARD

Card Type: I Planned 10/88 by R.H. Burke  
 (Circle) II Laid Out Date IDT Leader/Timber Rep.  
 III Modification Date by

Sale Name APC SEIS  
 Unit No. 400-4  
 Acres 20  
 Vol/Acre 40.0 MBF  
 Total Vol 800 MBF  
 Alternative 2,3,4

Reviewed By \_\_\_\_\_ Date \_\_\_\_\_

Approved By \_\_\_\_\_ Date \_\_\_\_\_  
 District Ranger

VCU 400 Compartment 2 Stand Number(s) 115

DATE & INITIALS	REMARKS	For Laid Out & Modified Units: Are the impacts of the unit different than those anticipated in the EIS? If yes, explain.
	Cultural	
*	<input type="checkbox"/> N	No cultural resource concerns.
	<input type="checkbox"/> Y	
	Fisheries	
*	<input type="checkbox"/> N	No Class I or II AHMUs within or approaching unit. No direct effect on fish habitat.
	<input type="checkbox"/> Y	
	Lands	
*	<input type="checkbox"/> N	No concerns.
	<input type="checkbox"/> Y	
	Recreation	
*	<input type="checkbox"/> N	No anticipated impacts to "recreation places".
	<input type="checkbox"/> Y	
	Silviculture (should be last to review)	
*	<input type="checkbox"/> N	Clearcut with natural regeneration and PCT.
	<input checked="" type="checkbox"/> Y	
	Soils	
*	<input type="checkbox"/> N	No apparent soil management problems.
	<input type="checkbox"/> Y	
	Visual	
*	<input type="checkbox"/> N	Unit will meet assigned VQO of Maximim Modification
	<input type="checkbox"/> Y	
	Water	
*	<input type="checkbox"/> N	A high gradient channel borders the NE edge of the unit. Sideslope protection is recommended.
	<input type="checkbox"/> Y	
	Wildlife	
*	<input type="checkbox"/> N	Unit is located in leave strip between old cutting units and provides good thermal cover for wintering deer. Defer thinning until wildlife biologist certifies that sufficient hiding and thermal cover is present in adjacent stands.
	<input type="checkbox"/> Y	

\*For planned unit check box if you want to be notified when unit will be laid out

SA 1900-1  
 (Rev. 3/88)



Unit Number 400-4

Layout considerations (windthrow,  
future settings, etc.)  
C. clauses (Independent Sales)

Project Area Map

Date: 8-4-77 Flight Line: 5 Roll: 376 Print # 77

↑  
N  
True



Scale 1" = 1320'

Departures from original plan:



## UNIT LAYOUT CARD

Card Type: I Planned 10/88 by R.H. Burke  
 (Circle) Date IDT Leader/Timber Rep.  
 II Laid Out by  
 Date  
 III Modification by  
 Date

Sale Name APC SEIS  
 Unit No. 400-5  
 Acres 24  
 Vol/Acre 40.0 MBF  
 Total Vol 960 MBF  
 Alternative 2,3,4

Reviewed By \_\_\_\_\_ Date \_\_\_\_\_

Approved By \_\_\_\_\_ Date \_\_\_\_\_  
 District Ranger

VCU 400 \_\_\_\_\_ Compartment 2 \_\_\_\_\_ Stand Number(s) 104 \_\_\_\_\_

DATE & INITIALS	REMARKS	For Laid Out & Modified Units: Are the impacts of the unit different than those anticipated in the EIS? If yes, explain.
	Cultural	
	<input type="checkbox"/> N	No cultural resource concerns.
*	<input type="checkbox"/> Y	
	Fisheries	
	<input type="checkbox"/> N	No Class I or II AHMUs within or approaching unit. No direct effect on fish habitat.
*	<input type="checkbox"/> Y	
	Lands	
	<input type="checkbox"/> N	No concerns.
*	<input type="checkbox"/> Y	
	Recreation	
	<input type="checkbox"/> N	No anticipated impacts to "recreation places".
*	<input type="checkbox"/> Y	
	Silviculture (should be last to review)	
	<input type="checkbox"/> N	Clearcut with natural regeneration and PCT.
*	<input type="checkbox"/> Y	
X	Soils	
	<input type="checkbox"/> N	No apparent soil management problems.
*	<input type="checkbox"/> Y	
	Visual	
	<input type="checkbox"/> N	As an individual unit, will meet assigned VQO of Modification.
*	<input type="checkbox"/> Y	
	Water	
	<input type="checkbox"/> N	No mapped streams cross or directly border the unit. No anticipated water concerns.
*	<input type="checkbox"/> Y	
	Wildlife	
	<input type="checkbox"/> N	Unit is located in leave strip between old cutting units and provides good thermal cover for wintering deer. Defer thinning until wildlife biologist certifies that sufficient hiding and thermal cover is present in adjacent stands.
*	<input type="checkbox"/> Y	

\*For planned unit check box if you want to be notified when unit will be laid out

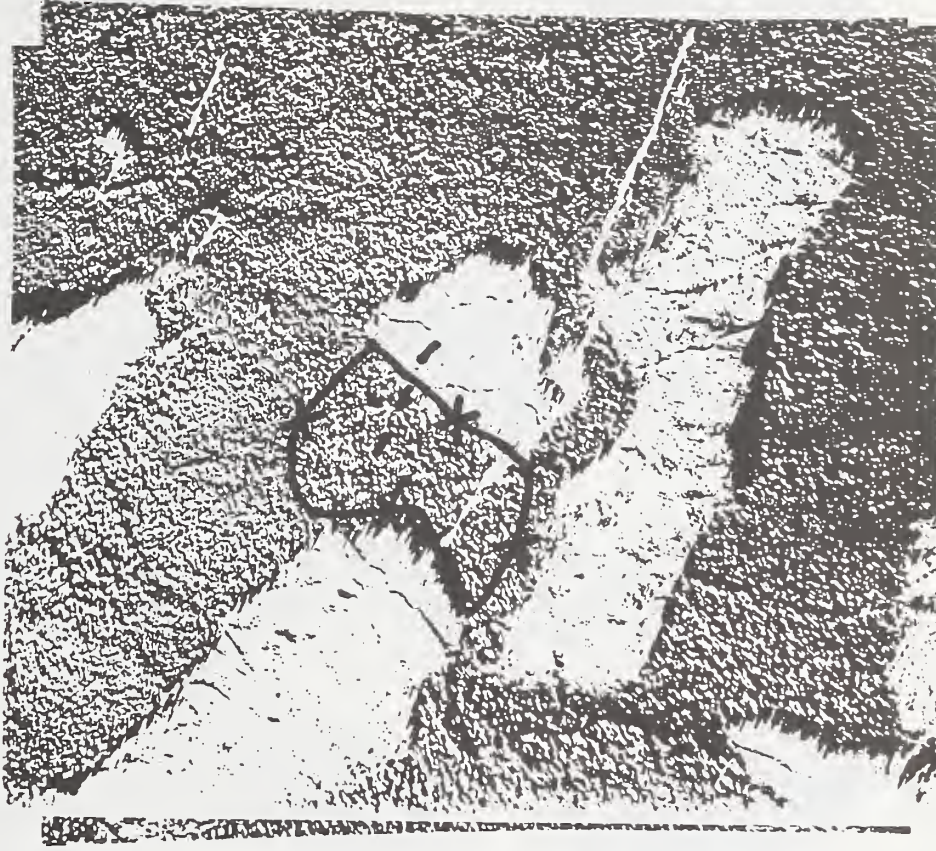
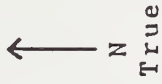
SA 1900-1  
 (Rev. 3/88)

Unit Number 400-5

Layout considerations (windthrow,  
future settings, etc.)  
C. clauses (Independent Sales)

Project Area Map

Date: 8-4-77 Flight Line: 5 Roll: 376 Print # 77



Scale 1" = 1320'

Departures from original plan:

## UNIT LAYOUT CARD

Card Type: I Planned 10/88 by R.H. Burke  
 (Circle) Date IDT Leader/Timber Rep.  
 II Laid Out by  
 Date  
 III Modification by  
 Date

Sale Name APC SEIS  
 Unit No. 400-6  
 Acres 54  
 Vol/Acre 36.6 MBF  
 Total Vol 1,976 MBF  
 Alternative 2,3,4

Reviewed By \_\_\_\_\_ Date \_\_\_\_\_

Approved By \_\_\_\_\_ Date \_\_\_\_\_  
 District Ranger

VCU 400 Compartment 2 Stand Number(s) 110

DATE & INITIALS	REMARKS	For Laid Out & Modified Units: Are the impacts of the unit different than those anticipated in the EIS? If yes, explain.
	Cultural	
*	<input type="checkbox"/> N	No cultural resource concerns.
	<input type="checkbox"/> Y	
	Fisheries	
*	<input type="checkbox"/> N	Unit borders inventoried Class II AHMU on south side. May be Class I with coho rearing habitat. Fisheries biologist will verify during layout. Protect with 100' AHMU buffer.
	<input checked="" type="checkbox"/> Y	
	Lands	
*	<input type="checkbox"/> N	No concerns.
	<input type="checkbox"/> Y	
	Recreation	
*	<input type="checkbox"/> N	No anticipated impacts to "recreation places".
	<input type="checkbox"/> Y	
	Silviculture (should be last to review)	
*	<input type="checkbox"/> N	Clearcut with natural regeneration and PCT.
	<input checked="" type="checkbox"/> Y	
	Soils	
*	<input type="checkbox"/> N	No apparent soil management problems.
	<input type="checkbox"/> Y	
	Visual	
*	<input type="checkbox"/> N	Unit will meet assigned VQO of Maximim Modification
	<input type="checkbox"/> Y	No visual concern.
	Water	
*	<input type="checkbox"/> N	A low gradient floodplain stream borders the southern edge of the unit. Protect streambanks and leave LOD sources. Also, provide sideslope protection for the high gradient channel on the east side of the unit.
	<input type="checkbox"/> Y	
	Wildlife	
*	<input type="checkbox"/> N	Impacts of the unit as planned are not different than those anticipated in the SEIS. Implementation of the AHMU
	<input type="checkbox"/> Y	prescriptions will mitigate riparian habitat concerns.

\*For planned unit check box if you want to be notified when unit will be laid out

SA 1900-1  
 (Rev. 3/88)

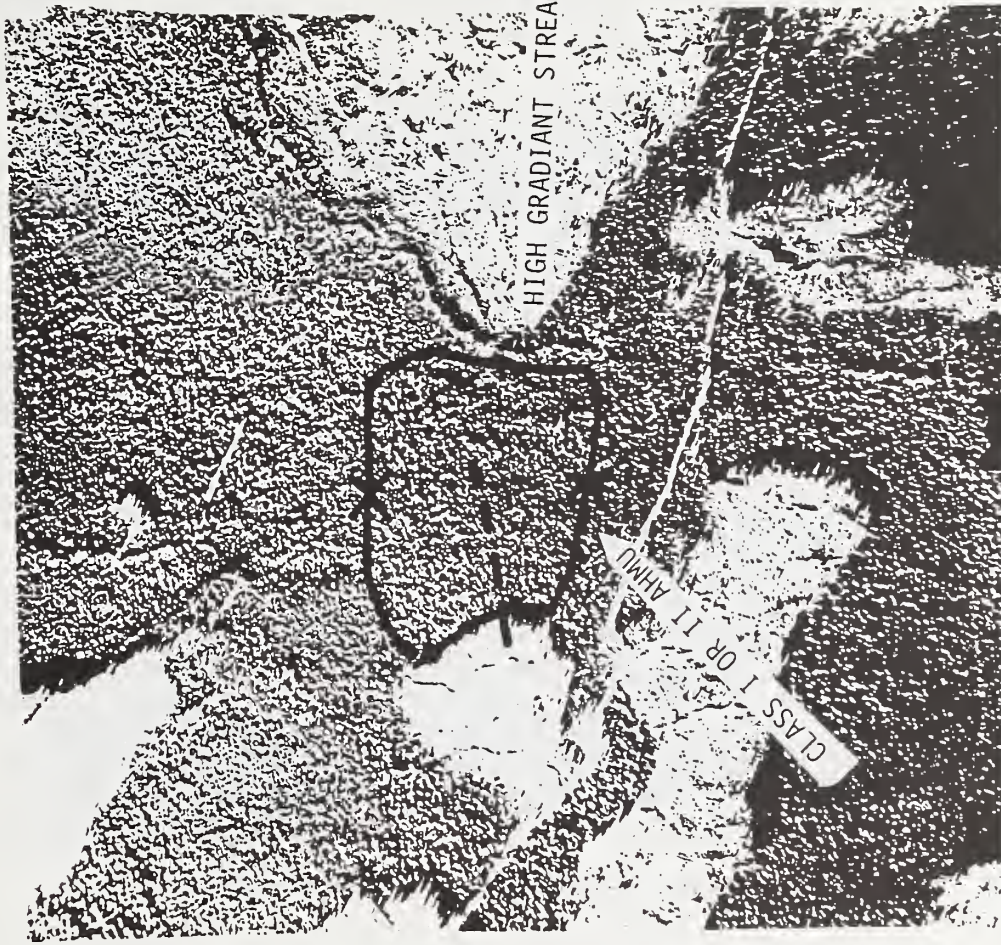
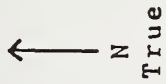


Unit Number 400-6

Layout considerations (windthrow,  
future settings, etc.)  
C. clauses (Independent Sales)

Project Area Map




Date: 8-4-77 Flight Line: 5 Roll: 376 Print # 77



Scale 1" = 1320'

Departures from original plan:

LEGEND

-  CUTTING BOUNDARY
-  SYSTEM ROAD
-  SPUR ROAD

## UNIT LAYOUT CARD

Card Type: I Planned 10/88 by R.H. Burke  
 (Circle) II Laid Out Date IDT Leader/Timber Rep.  
 III Modification Date by  
 Date

Sale Name APC SEIS  
 Unit No. 400-7  
 Acres 90  
 Vol/Acre 24.8 MBF  
 Total Vol 2,232 MBF  
 Alternative 2,3,4

Reviewed By \_\_\_\_\_ Date \_\_\_\_\_

Approved By \_\_\_\_\_ Date \_\_\_\_\_  
 District Ranger

VCU 400 \_\_\_\_\_ Compartment 2 \_\_\_\_\_ Stand Number(s) 81 \_\_\_\_\_

DATE & INITIALS	REMARKS	For Laid Out & Modified Units: Are the impacts of the unit different than those anticipated in the EIS? If yes, explain.
	Cultural	
*	<input type="checkbox"/> N	No cultural resource concerns.
	<input type="checkbox"/> Y	
	Fisheries	
*	<input type="checkbox"/> N	Apply Class I AHMU prescriptions within 100' of stream on SE side of unit. No direct effect on fish habitat with wind-firm buffer.
	<input checked="" type="checkbox"/> Y	
	Lands	
*	<input type="checkbox"/> N	No concerns.
	<input type="checkbox"/> Y	
	Recreation	
*	<input type="checkbox"/> N	No anticipated impacts to "recreation places".
	<input type="checkbox"/> Y	
	Silviculture (should be last to review)	
*	<input type="checkbox"/> N	Clearcut with natural regeneration and PCT.
	<input checked="" type="checkbox"/> Y	
	Soils	
*	<input type="checkbox"/> N	No apparent soil management problems.
	<input type="checkbox"/> Y	
	Visual	
*	<input type="checkbox"/> N	No visual concerns, unit located in low lying topography.
	<input type="checkbox"/> Y	
	Water	
*	<input type="checkbox"/> N	No mapped streams cross or directly border the unit. No anticipated water concerns.
	<input type="checkbox"/> Y	
	Wildlife	
*	<input type="checkbox"/> N	Unit is located in an area that was designated to be managed for old-growth habitat until 1990. There is an adequate amount of suitable habitat nearby to mitigate loss of this old-growth.
	<input type="checkbox"/> Y	

\*For planned unit check box if you want to be notified when unit will be laid out

SA 1900-1  
 (Rev. 3/88)



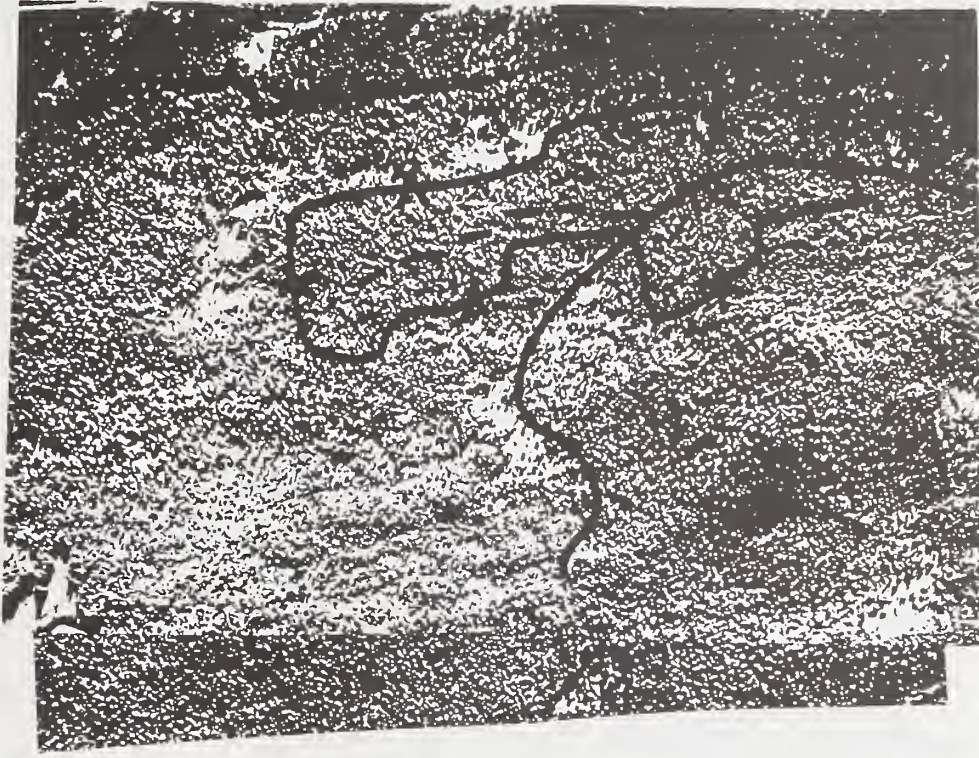
Unit Number 400-7

Layout considerations (windthrow,  
future settings, etc.)  
C. clauses (Independent Sales)

Project Area Map

Date: 8-4-77 Flight Line: 4 Roll: 376 Print # 33

↑ N  
True



Scale 1" = 1320'

Departures from original plan:

LEGEND

	CUTTING BOUNDARY
	SYSTEM ROAD
	SPUR ROAD



## UNIT LAYOUT CARD

Card Type: I Planned 10/88 by R.H. Burke  
 (Circle) Date IDT Leader/Timber Rep.  
 II Laid Out by  
 Date  
 III Modification by  
 Date

Sale Name APC SEIS  
 Unit No. 400-8  
 Acres 12  
 Vol/Acre 24.8 MBF  
 Total Vol 298 MBF  
 Alternative 2

Reviewed By \_\_\_\_\_ Date \_\_\_\_\_

Approved By \_\_\_\_\_ Date \_\_\_\_\_  
 District Ranger

VCU 400 Compartment 2 Stand Number(s) 80

DATE & INITIALS	REMARKS	For Laid Out & Modified Units: Are the impacts of the unit different than those anticipated in the EIS? If yes, explain.
	Cultural	
	<input type="checkbox"/> N	No cultural resource concerns.
*	<input type="checkbox"/> Y	
	Fisheries	
	<input type="checkbox"/> N	No Class I or II AHMUs within or approaching unit. No direct effect on fish habitat.
*	<input type="checkbox"/> Y	
	Lands	
	<input type="checkbox"/> N	No concerns.
*	<input type="checkbox"/> Y	
	Recreation	
	<input type="checkbox"/> N	No anticipated impacts to "recreation places".
*	<input type="checkbox"/> Y	
	Silviculture (should be last to review)	
	<input type="checkbox"/> N	Clearcut with natural regeneration and PCT.
*	<input type="checkbox"/> Y	
X	Soils	
	<input type="checkbox"/> N	No apparent soil management problems.
*	<input type="checkbox"/> Y	
	Visual	
	<input type="checkbox"/> N	No visual concerns.
*	<input type="checkbox"/> Y	
	Water	
	<input type="checkbox"/> N	No mapped streams cross or directly border the unit. No anticipated water concerns.
*	<input type="checkbox"/> Y	
	Wildlife	
	<input type="checkbox"/> N	Unit is located in an area designated to be managed for old growth habitat until 1990. There is an adequate amount of near by old growth to mitigate the harvest of this habitat.
*	<input type="checkbox"/> Y	

\*For planned unit check box if you want to be notified when unit will be laid out

SA 1900-1  
 (Rev. 3/88)

Unit Number 400-8

Layout considerations (windthrow,  
future settings, etc.)  
C. clauses (Independent Sales)

Project Area Map

Date: 8-4-77 Flight Line: 4 Roll: 376 Print # 33

↑  
N  
True



Scale 1" = 1320'

Departures from original plan:

LEGEND

- ✕ — ✕ CUTTING BOUNDARY  
— — — — — SYSTEM ROAD  
— — — — — SPUR ROAD

25.

## UNIT LAYOUT CARD

Card Type: I Planned 10/88 by R.H. Burke  
 (Circle) Date IDT Leader/Timber Rep.  
 II Laid Out by  
 Date  
 III Modification by  
 Date

Sale Name APC SEIS  
 Unit No. 400-14  
 Acres 41  
 Vol/Acre 28.5 MBF  
 Total Vol 1,167 MBF  
 Alternative 2

Reviewed By \_\_\_\_\_ Date \_\_\_\_\_

Approved By \_\_\_\_\_ Date \_\_\_\_\_  
 District Ranger

VCU 400 Compartment 2 Stand Number(s) 72

DATE & INITIALS	REMARKS	For Laid Out & Modified Units: Are the impacts of the unit different than those anticipated in the EIS? If yes, explain.
	Cultural	
	<input type="checkbox"/> N	Unit is in moderate probability zone for cultural resources. A cultural survey is required prior to operation.
*	<input type="checkbox"/> Y	
<input checked="" type="checkbox"/>	Fisheries	
	<input type="checkbox"/> N	No Class I or II AHMUs within or approaching unit. No 0' direct effect on fish habitat.
*	<input type="checkbox"/> Y	
<input type="checkbox"/>	Lands	
	<input type="checkbox"/> N	This land is under consideration for State selection until 1992. Any investments made prior to that time would be at risk of loss through State selection.
*	<input type="checkbox"/> Y	
<input type="checkbox"/>	Recreation	
	<input type="checkbox"/> N	Unit will change recreation experience near estuary from primitive to motorized. This will be partially mitigated by locating road as far back as practical from estuary.
*	<input type="checkbox"/> Y	
<input type="checkbox"/>	Silviculture (should be last to review)	
	<input type="checkbox"/> N	Clearcut with natural regeneration and PCT.
*	<input type="checkbox"/> Y	
<input checked="" type="checkbox"/>	Soils	
	<input type="checkbox"/> N	Oversteepened, landslide prone soils upslope from unit. Locate backline at base of oversteepened slope to protect soils without isolating timber at base of slope.
*	<input type="checkbox"/> Y	
<input checked="" type="checkbox"/>	Visual	
	<input type="checkbox"/> N	Unit designed with "soft" backline to minimize apparent size as seen from head of Security Bay. Will meet assigned VQO of Modification.
*	<input type="checkbox"/> Y	
<input type="checkbox"/>	Water	
	<input type="checkbox"/> N	Two short segments of high gradient stream cross through the unit, one at the north end and one at the south end. Both will require partial suspension.
*	<input type="checkbox"/> Y	
<input type="checkbox"/>	Wildlife	
	<input type="checkbox"/> N	A part of the unit is in an area to be managed for old growth habitat through 1990. Good availability of adjacent old growth lessens the impact to old growth dependent species.
*	<input type="checkbox"/> Y	

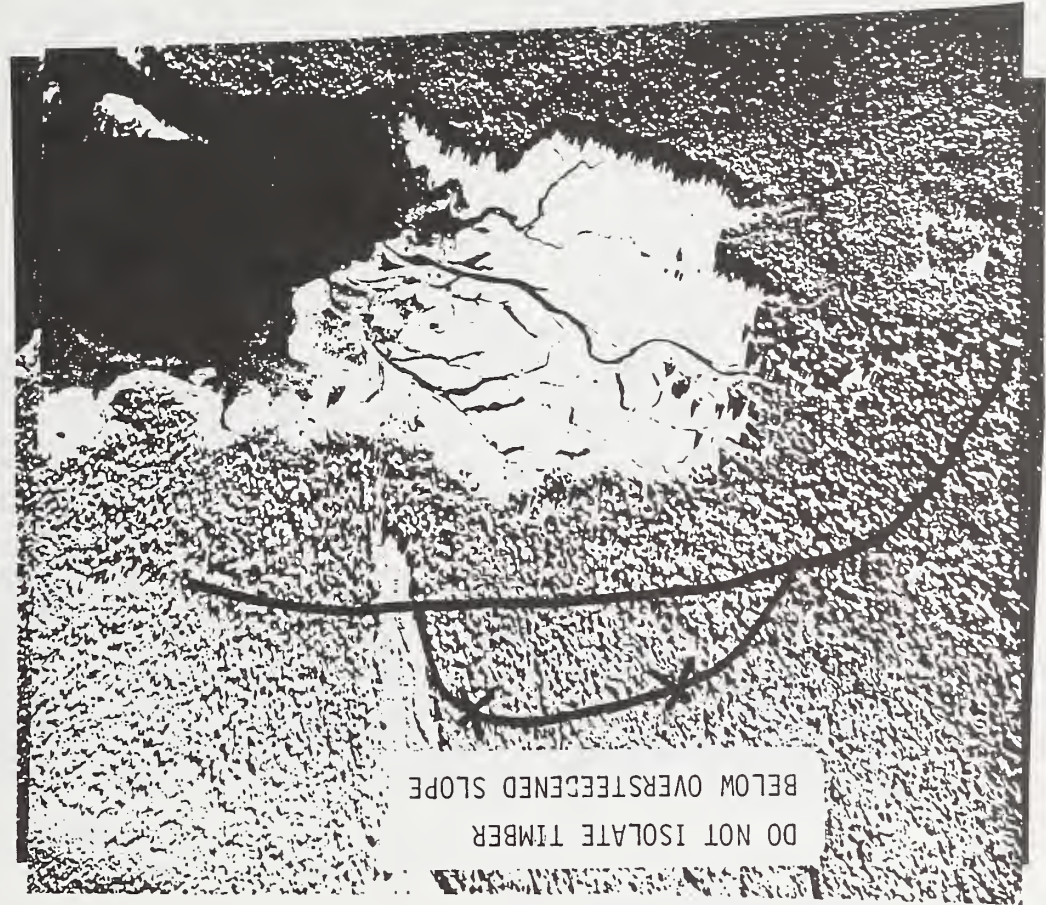
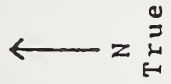
\*For planned unit check box if you want to be notified when unit will be laid out

SA 1900-1  
 (Rev. 3/88)



Layout considerations (windthrow, future settings, etc.)  
C. clauses (Independent Sales)  
Put upper cutting boundary as high on hill as possible so as not to isolate timber.

Departures from original plan:



Scale 1" = 1320'

- LEGEND
- CUTTING BOUNDARY
  - SYSTEM ROAD
  - SPUR ROAD

## UNIT LAYOUT CARD

Card Type: I Planned 10/88 by R.H. Burke  
 (Circle) Date IDT Leader/Timber Rep.  
 II Laid Out by  
 Date  
 III Modification by  
 Date

Sale Name APC SEIS  
 Unit No. 400-15  
 Acres 80  
 Vol/Acre 40.0 MBF  
 Total Vol 3,200 MBF  
 Alternative 2

Reviewed By \_\_\_\_\_ Date \_\_\_\_\_

Approved By \_\_\_\_\_ Date \_\_\_\_\_  
 District Ranger

VCU 400 \_\_\_\_\_ Compartment 2 \_\_\_\_\_ Stand Number(s) 78 \_\_\_\_\_

DATE & INITIALS	REMARKS	For Laid Out & Modified Units: Are the impacts of the unit different than those anticipated in the EIS? If yes, explain.
	Cultural	
	<input type="checkbox"/> N	Unit is within the moderate to low probability zone.
*	<input type="checkbox"/> Y	Portions of the unit will require a survey prior to development
X	<input checked="" type="checkbox"/> Y	
	Fisheries	
	<input type="checkbox"/> N	Unit borders a Class I AHMU on the west side. Apply AHMU prescriptions within 100' of stream to protect fish habitat.
*	<input type="checkbox"/> Y	
	Lands	
	<input type="checkbox"/> N	This land is under consideration for State land selection unit 1992. Any investment made prior to that date would be at risk of loss through State selection.
*	<input type="checkbox"/> Y	
	Recreation	
	<input type="checkbox"/> N	Southern portion of unit is located within "known recreation place", changing experience from primitive to motorized. No mitigation available.
*	<input type="checkbox"/> Y	
	Silviculture (should be last to review)	
	<input type="checkbox"/> N	Clearcut with natural regeneration. Design PCT with fish and wildlife input.
*	<input type="checkbox"/> Y	
X	<input checked="" type="checkbox"/> Y	
	Soils	
	<input type="checkbox"/> N	No apparent soil management problems. Good site.
*	<input type="checkbox"/> Y	
	Visual	
	<input type="checkbox"/> N	Unit will meet assigned VQO of Modification. No visual concerns.
*	<input type="checkbox"/> Y	
	Water	
	<input type="checkbox"/> N	There is a small stream bordering the unit. Maintain stream-bank stability and future LOD with 100' Class II AHMU prescriptions.
*	<input type="checkbox"/> Y	
	Wildlife	
	<input type="checkbox"/> N	Unit is located in an area designated to be managed for old dependent species through 1990. Sufficient suitable habitat is available to mitigate loss of this habitat.
*	<input type="checkbox"/> Y	

\*For planned unit check box if you want to be notified when unit will be laid out

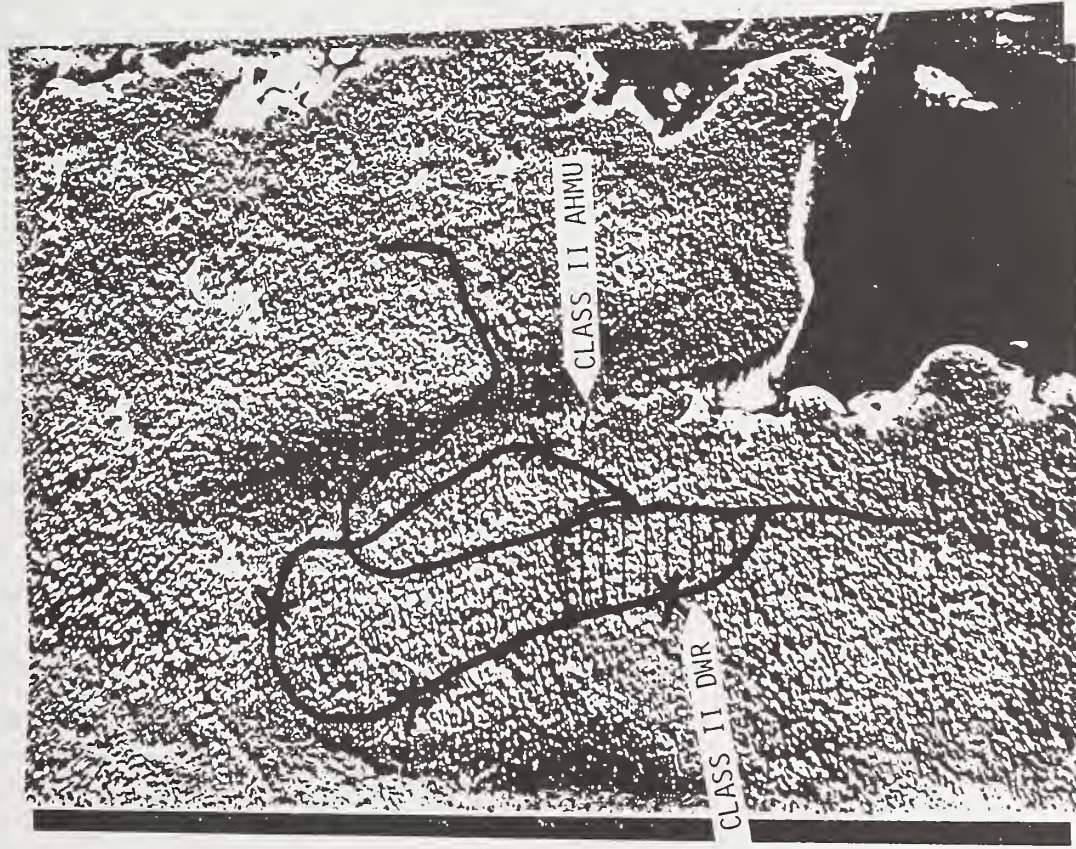
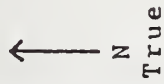
SA 1900-1  
 (Rev. 3/88)



Date: 8-4-77 Flight Line: 4 Roll: 376 Print # 32

Layout considerations (windthrow, future settings, etc.)  
 C. clauses (Independent Sales)  
 Put upper boundary as high on hill as possible so as not to isolate timber.

Departures from original plan:



Scale 1" = 1320'

## LEGEND

- X — CUTTING BOUNDARY  
 — SYSTEM ROAD  
 - - - SPUR ROAD



## UNIT LAYOUT CARD

Card Type: I Planned 10/88 by R.H. Burke  
 (Circle) II Laid Out Date IDT Leader/Timber Rep.  
 III Modification Date by

Sale Name APC SEIS  
 Unit No. 400-18  
 Acres 100  
 Vol/Acre 24.8 MBF  
 Total Vol 2,480 MBF  
 Alternative 2

Reviewed By \_\_\_\_\_ Date \_\_\_\_\_

Approved By \_\_\_\_\_ Date \_\_\_\_\_  
 District Ranger

VCU 400 Compartment 2 Stand Number(s) 96

DATE & INITIALS	REMARKS	For Laid Out & Modified Units: Are the impacts of the unit different than those anticipated in the EIS? If yes, explain.
	Cultural	
*	<input type="checkbox"/> N	No cultural resource concerns.
	<input type="checkbox"/> Y	
	Fisheries	
*	<input type="checkbox"/> N	Class I AHMU runs across unit. Apply AHMU prescriptions within 100' on both sides of stream. Some high value trees may be removed.
	<input checked="" type="checkbox"/> Y	
	Lands	
*	<input type="checkbox"/> N	This land is under consideration for State land selection until 1992. Any investments made prior to that time would be at risk of loss through State selection.
	<input type="checkbox"/> Y	
	Recreation	
*	<input type="checkbox"/> N	No anticipated impacts to "recreation places".
	<input type="checkbox"/> Y	
	Silviculture (should be last to review)	
*	<input type="checkbox"/> N	Clearcut with natural regeneration and PCT.
	<input checked="" type="checkbox"/> Y	
	Soils	
*	<input type="checkbox"/> N	Stream in northern portion of unit needs full suspension to protect stream banks. If full suspension is not possible, harvest one side only.
	<input type="checkbox"/> Y	
	Visual	
*	<input type="checkbox"/> N	Unit will meet assigned VQO of Maximim Modification
	<input type="checkbox"/> Y	
	Water	
*	<input type="checkbox"/> N	The unit has two streams flowing through it; one a small floodplain channel, and one an alluvial fan channel. Both require streambank protection and a future source of LOD.
	<input type="checkbox"/> Y	
	Wildlife	
*	<input type="checkbox"/> N	The unit is in old-growth and deer winter range. Spacing of units and adjacent habitat will mitigate loss of habitat.
	<input type="checkbox"/> Y	Protect deer habitat with 20x20 PCT at 15-20 yrs. Conduct annual eagle survey along Security Bay shoreline.

\*For planned unit check box if you want to be notified when unit will be laid out

SA 1900-1




Layout considerations (windthrow, future settings, etc.)  
C. clauses (Independent Sales)

Departures from original plan:



Scale 1" = 1320'

LEGEND

-  CUTTING BOUNDARY
-  SYSTEM ROAD
-  SPUR ROAD



## UNIT LAYOUT CARD

Card Type: I Planned 10/88 by R.H. Burke  
 (Circle) II Laid Out Date IDT Leader/Timber Rep.  
 III Modification Date by

Sale Name APC SEIS  
 Unit No. 400-19  
 Acres 87  
 Vol/Acre 23.3 MBF  
 Total Vol 2,024 MBF  
 Alternative 2

Reviewed By \_\_\_\_\_ Date \_\_\_\_\_

Approved By \_\_\_\_\_ Date \_\_\_\_\_  
 District Ranger

VCU 400 \_\_\_\_\_ Compartment 2 \_\_\_\_\_ Stand Number(s) 96 \_\_\_\_\_

DATE & INITIALS	REMARKS	For Laid Out & Modified Units: Are the impacts of the unit different than those anticipated in the EIS? If yes, explain.
	Cultural	
	<input type="checkbox"/> N	Unit is in low probability zone for cultural. Due to proximity to Bay, portions of the unit will need cultural resource survey prior to release for development.
*	<input checked="" type="checkbox"/> Y	
	Fisheries	
	<input type="checkbox"/> N	Class I AHMU runs across unit. Mitigation for this B2 channel is stream bank protection and maintenance of LOD sources by use of AHMU Rx for 100' on both sides. Could harvest some lg trees
*	<input checked="" type="checkbox"/> Y	
	Lands	
	<input type="checkbox"/> N	This land is under consideration for State selection until 1992. Any investments made prior to that time would be at risk of loss through State selection.
*	<input type="checkbox"/> Y	
	Recreation	
	<input type="checkbox"/> N	No anticipated impacts to "recreation places".
*	<input type="checkbox"/> Y	
	Silviculture (should be last to review)	
	<input type="checkbox"/> N	Clearcut with natural regeneration and PCT with wildlife input. Full or partial suspension required for soil protection.
*	<input checked="" type="checkbox"/> Y	
	Soils	
	<input type="checkbox"/> N	Streambank protection needed in center of unit. Use split line or fully suspend logs across drainage. See discussion in "Water".
*	<input checked="" type="checkbox"/> Y	
	Visual	
	<input type="checkbox"/> N	As planned, the unit will be highly visible from Security Bay. Northern portion of unit, which rounds to the N.W. will be most dominant. L.A. needs to be involved in any proposed changes.
*	<input checked="" type="checkbox"/> Y	
	Water	
	<input type="checkbox"/> N	Streambank protection is needed for stream following east edge of unit. Future LOD sources should be protected. High gradient stream through center of unit requires sideslope protection, either splitline or full suspension.
*	<input type="checkbox"/> Y	
	Wildlife	
	<input type="checkbox"/> N	Protect deer habitat by thinning to 20x20. Spot prune to 16'. Establish 10 yr monitoring plan to access effectiveness of pruning as winter habitat improvement.
*	<input type="checkbox"/> Y	

\*For planned unit check box if you want to be notified when unit will be laid out

SA 1900-1  
 (Rev. 3/88)



Layout considerations (windthrow, future settings, etc.)

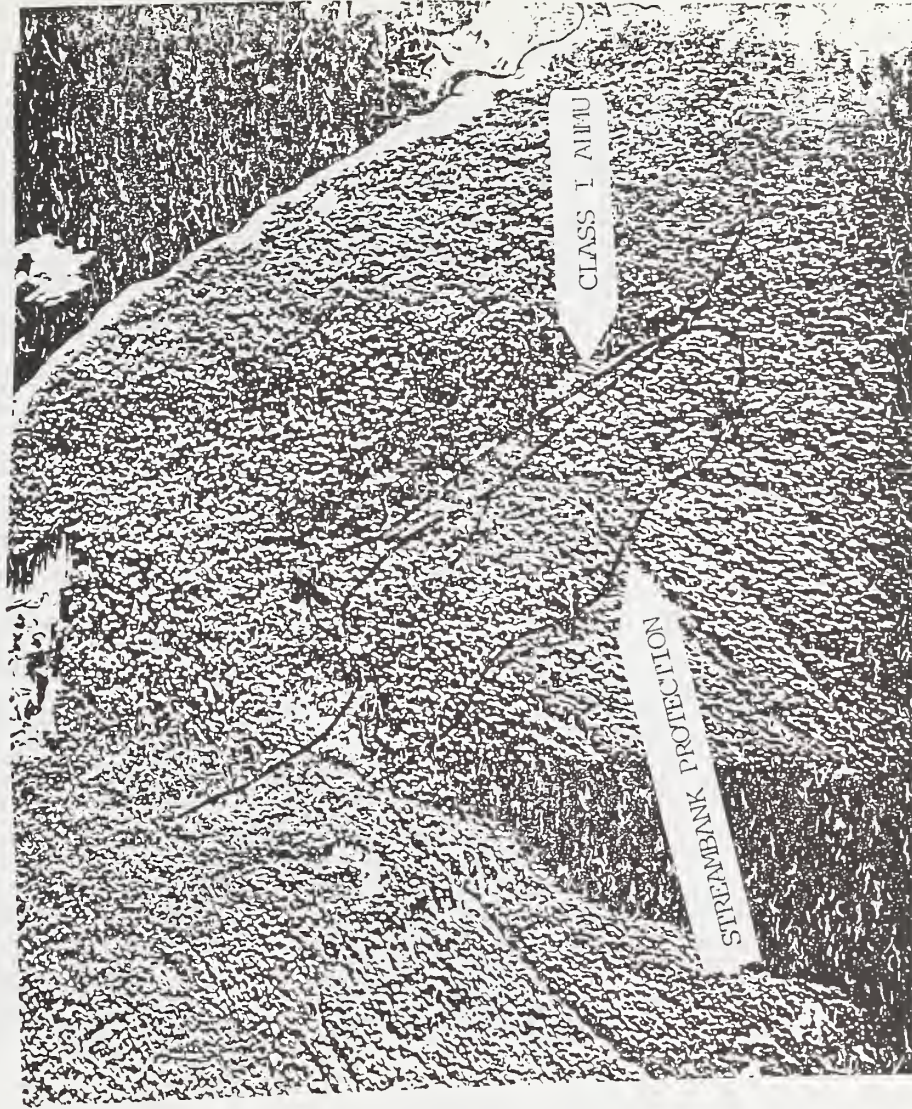
C. clauses (Independent Sales)

North west boundary is on scrub to prevent windthrow. Put upper boundary as high as possible so as not to isolate timber.

Departures from original plan:

Date: 8-4-77 Flight Line: 3 Roll: 276 Print # 128

↑ N  
True



Scale 1" = 1320'

# LEGEND

- X — CUTTING BOUNDARY
- SYSTEM ROAD
- SPUR ROAD

## UNIT LAYOUT CARD

Card Type: I Planned 10/88 by R.H. Burke  
 (Circle) Date IDT Leader/Timber Rep.  
 II Laid Out by  
 Date  
 III Modification by  
 Date

Sale Name APC SEIS  
 Unit No. 400-21  
 Acres 59  
 Vol/Acre 24.8 MBF  
 Total Vol 1,463 MBF  
 Alternative 2

Reviewed By \_\_\_\_\_ Date \_\_\_\_\_

Approved By \_\_\_\_\_ Date \_\_\_\_\_  
 District Ranger

VCU 400 Compartment 2 Stand Number(s) 118

DATE & INITIALS	REMARKS	For Laid Out & Modified Units: Are the impacts of the unit different than those anticipated in the EIS? If yes, explain.
	Cultural	
	<input type="checkbox"/> N	Unit is in low to moderate probability zone for cultural resources. Survey lower portion of unit and road corridor prior to release.
*	<input checked="" type="checkbox"/> Y	
	Fisheries	
	<input type="checkbox"/> N	Class I AHMU runs across unit. If site visit confirms coho rearing habitat, apply AHMU Class 1 Rx for 100' on both sides to protect B2 channel. Some high value trees could be
*	<input checked="" type="checkbox"/> Y	
	Lands	
	<input type="checkbox"/> N	This land is under consideration for State land selection until 1992. Any investments made prior to that time would be at risk of loss through State selection.
*	<input type="checkbox"/> Y	
	Recreation	
	<input type="checkbox"/> N	No recreation concerns.
*	<input type="checkbox"/> Y	
	Silviculture (should be last to review)	
	<input type="checkbox"/> N	Clearcut with natural regeneration and PCT with fish and wildlife input. Possible partial corridor harvest in leave strips.
*	<input checked="" type="checkbox"/> Y	
	Soils	
	<input type="checkbox"/> N	No apparent soil management problems if AHMU Rx applied.
*	<input type="checkbox"/> Y	
	Visual	
	<input type="checkbox"/> N	Unit will meet assigned VQO of Maximim Modification Designed with irregular backline so as to not dominate hillside as seen from east side of Bay (Marine Park and private home).
*	<input type="checkbox"/> Y	
	Water	
	<input type="checkbox"/> N	Unit contains a low gradient channel requiring streambank protection and maintenance of LOD sources. Short segment of high gradient channel (same stream) will require sideslope protection, possibly splitline entire stream.
*	<input type="checkbox"/> Y	
	Wildlife	
	<input type="checkbox"/> N	Improve second growth habitat by PCT to 20x20. Spot prune to 16'. Thinning to 20x20 is effective mitigation. Spot pruning will need to be monitored to determine effectiveness.
*	<input type="checkbox"/> Y	

\*For planned unit check box if you want to be notified when unit will be laid out

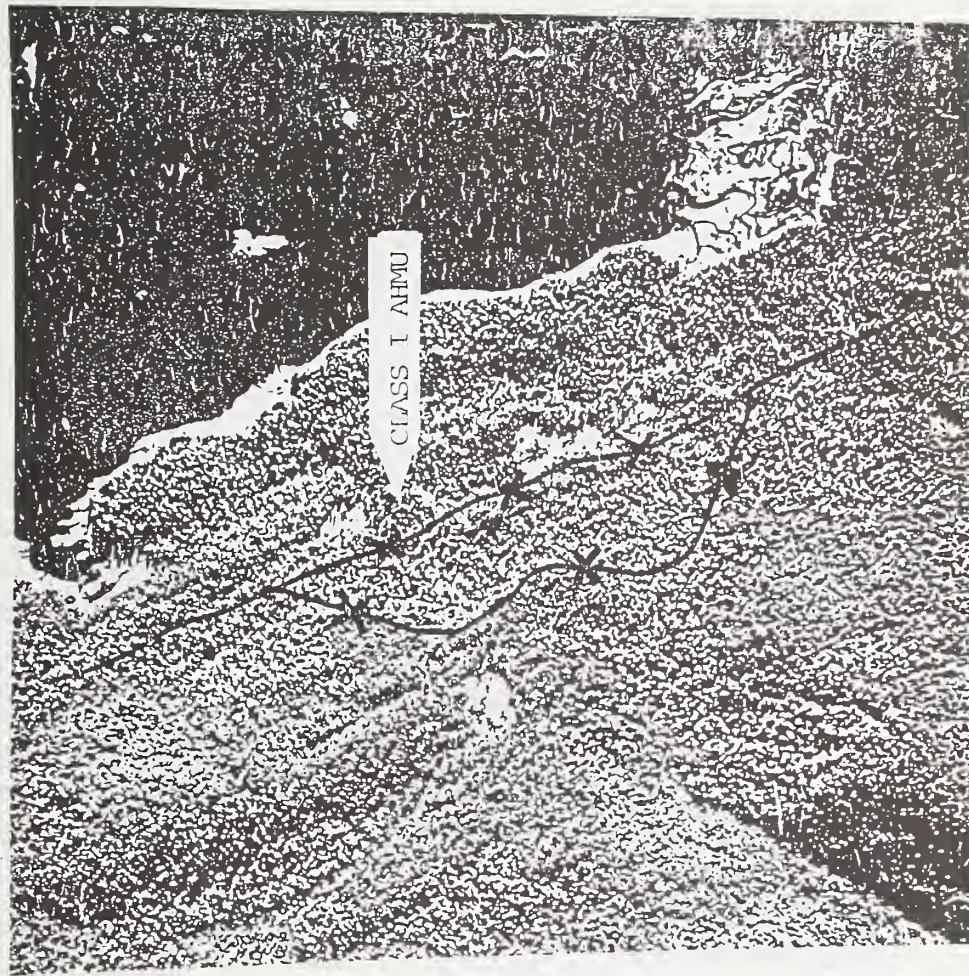
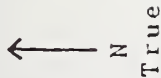
SA 1900-1  
 (Rev. 3/88)



Layout considerations (windthrow,  
future settings, etc.)  
C. clauses (Independent Sales)

Date: 8-4-77 Flight Line: 2 Roll: 276 Print # 166

Departures from original plan:



Scale 1" = 1320'

LEGEND

- ✕ — ✕ CUTTING BOUNDARY
- SYSTEM ROAD
- - - - SPUR ROAD



## UNIT LAYOUT CARD

Card Type: I Planned 10/88 by R.H. Burke  
 (Circle) Date IDT Leader/Timber Rep.  
 II Laid Out by  
 Date  
 III Modification by  
 Date

Sale Name APC SEIS  
 Unit No. 400-24  
 Acres 66  
 Vol/Acre 19.6 MBF  
 Total Vol 1,447 MBF  
 Alternative 2

Reviewed By \_\_\_\_\_ Date \_\_\_\_\_

Approved By \_\_\_\_\_ Date \_\_\_\_\_

District Ranger

VCU 400 Compartment 2 Stand Number(s) 118

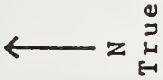
DATE & INITIALS	REMARKS	For Laid Out & Modified Units: Are the impacts of the unit different than those anticipated in the EIS? If yes, explain.
	Cultural	
	<input type="checkbox"/> N	Unit is in moderate to low probability zone. Survey of unit perimeter (road corridor) will be sufficient to determine if cultural resource values are present prior to development.
*	<input type="checkbox"/> Y	
<input checked="" type="checkbox"/>	Fisheries	
	<input type="checkbox"/> N	Unit borders Class 1 AHMU on west side. Stream banks will be protected and LOD sources maintained by applying Class I AHMU prescriptions within 100' on both sides of stream.
*	<input type="checkbox"/> Y	
<input type="checkbox"/>	Lands	
	<input type="checkbox"/> N	This land is under consideration for possible State selection until 1992. Any investments made prior to that time would be at risk of loss through State selection.
*	<input type="checkbox"/> Y	
<input type="checkbox"/>	Recreation	
	<input type="checkbox"/> N	Unit is within an area recognized as a "recreation place". However no impacts to users (boaters) are expected.
*	<input type="checkbox"/> Y	
<input type="checkbox"/>	Silviculture (should be last to review)	
	<input type="checkbox"/> N	Clearcut with natural regeneration and PCT.
*	<input type="checkbox"/> Y	
<input checked="" type="checkbox"/>	Soils	
	<input type="checkbox"/> N	No apparent soil management problems.
*	<input type="checkbox"/> Y	
<input type="checkbox"/>	Visual	
	<input type="checkbox"/> N	Unit will meet assigned VQO of Maximim Modification
*	<input type="checkbox"/> Y	
<input type="checkbox"/>	Water	
	<input type="checkbox"/> N	A short segment of floodplain channel borders the SW corner of the unit. Stream bank protection is necessary as well as maintenance of LOD sources.
*	<input type="checkbox"/> Y	
<input type="checkbox"/>	Wildlife	
	<input type="checkbox"/> N	Precommercial thin to 20x20 to improve second growth forage production and bio-diversity. Establish transects and monitor to determine effectiveness. Conduct eagle survey prior to harvest operations.
*	<input type="checkbox"/> Y	

\*For planned unit check box if you want to be notified when unit will be laid out

SA 1900-1  
 (Rev. 3/88)

Layout considerations (windthrow, future settings, etc.)  
C. clauses (Independent Sales)

Date: 8-4-77 Flight Line: 2 Roll: 276 Print # 166



Scale 1" = 1320'

Departures from original plan:

- LEGEND
- CUTTING BOUNDARY
  - SYSTEM ROAD
  - SPUR ROAD

## UNIT LAYOUT CARD

Card Type: I Planned 10/88 by R.H. Burke  
 (Circle) II Laid Out Date IDT Leader/Timber Rep.  
 III Modification Date by

Sale Name APC SEIS  
 Unit No. 402-2  
 Acres 53  
 Vol/Acre 40.0 MBF  
 Total Vol 2,120 MBF  
 Alternative 2,3,4,5

Reviewed By \_\_\_\_\_ Date \_\_\_\_\_

Approved By \_\_\_\_\_ Date \_\_\_\_\_  
 District Ranger

VCU 402 Compartment 7 Stand Number(s) 103

DATE & INITIALS	REMARKS	For Laid Out & Modified Units: Are the impacts of the unit different than those anticipated in the EIS? If yes, explain.
	Cultural	
*	<input type="checkbox"/> N	No cultural resource concerns.
	<input type="checkbox"/> Y	
	Fisheries	
*	<input type="checkbox"/> N	Protect fish habitat with wind-firm 100' AHMU buffer along Rowan Creek. Two small Class I AHMUs (B2 channels) require streambank and LOD sources protected by applying Class I AHMU buffers within 100' of both banks. Some selective harvest OK.
	<input checked="" type="checkbox"/> Y	
	Lands	
*	<input type="checkbox"/> N	No concerns.
	<input type="checkbox"/> Y	
	Recreation	
*	<input type="checkbox"/> N	No anticipated impacts to "recreation places".
	<input type="checkbox"/> Y	
	Silviculture (should be last to review)	
*	<input type="checkbox"/> N	Clearcut with natural regeneration and PCT.
	<input checked="" type="checkbox"/> Y	
	Soils	
*	<input type="checkbox"/> N	Soils in the unit are somewhat poorly drained "blue clay" soils of the Sloduc Series. These are very erosive when disturbed. Partial suspension required on entire unit. No cut & fill >4'.
	<input type="checkbox"/> Y	
	Visual	
*	<input type="checkbox"/> N	No visual resource concerns.
	<input type="checkbox"/> Y	
	Water	
*	<input type="checkbox"/> N	Two sections of low gradient, small, floodplain type channels cross through unit. Streambank protection is needed to minimize channel instability and maintain LOD sources. Streambank protection also needed for channel on west edge of unit.
	<input type="checkbox"/> Y	
	Wildlife	
*	<input type="checkbox"/> N	Maintain important riparian habitat for nesting, forage, and travel by maintaining 100' windfirm buffer along Rowan Creek.
	<input type="checkbox"/> Y	

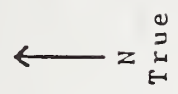
\*For planned unit check box if you want to be notified when unit will be laid out

SA 1900-1  
 (Rev. 3/88)



Layout considerations (windthrow, future settings, etc.)  
C. clauses (Independent Sales)

Date: 8-4-77 Flight Line: 5 Roll: 376 Print # 68



Scale 1" = 1320'

Departures from original plan:

- LEGEND
- CUTTING BOUNDARY
  - SYSTEM ROAD
  - SPUR ROAD

## UNIT LAYOUT CARD

Card Type: I Planned 10/88 by R.H. Burke  
 (Circle) Date IDT Leader/Timber Rep.  
 II Laid Out by  
 Date  
 III Modification by  
 Date

Sale Name APC SEIS  
 Unit No. 402-3  
 Acres 22  
 Vol/Acre 44.4 MBF  
 Total Vol 977 MBF  
 Alternative 2,3,4,5

Reviewed By \_\_\_\_\_ Date \_\_\_\_\_  
 Approved By \_\_\_\_\_ Date \_\_\_\_\_  
 District Ranger

VCU 402 Compartment 7 Stand Number(s) 103

DATE & INITIALS	REMARKS	For Laid Out & Modified Units: Are the impacts of the unit different than those anticipated in the EIS? If yes, explain.
	Cultural	
	<input type="checkbox"/> N	No cultural resource concerns.
*	<input type="checkbox"/> Y	
	Fisheries	
	<input type="checkbox"/> N	Class I AHMU borders south side of unit. Protect streambanks maintain LOD sources by maintaining 100" AHMU buffer along stream
*	<input checked="" type="checkbox"/> Y	Some high value trees may be removed.
	Lands	
	<input type="checkbox"/> N	No concerns.
*	<input type="checkbox"/> Y	
	Recreation	
	<input type="checkbox"/> N	No anticipated impacts to "recreation places".
*	<input type="checkbox"/> Y	
	Silviculture (should be last to review)	
	<input type="checkbox"/> N	Clearcut with natural regeneration and PCT.
*	<input checked="" type="checkbox"/> Y	
	Soils	
	<input type="checkbox"/> N	Riparian vegetation on 3 sides of unit (floodplain soils). No anticipated soil problems.
*	<input type="checkbox"/> Y	
	Visual	
	<input type="checkbox"/> N	No visual resource concerns.
*	<input type="checkbox"/> Y	
	Water	
	<input type="checkbox"/> N	Unit borders a short section of floodplain channel. Stream-bank protection and future sources of LOD will be maintained by applying AHMU prescriptions within 100 feet of channel.
*	<input type="checkbox"/> Y	
	Wildlife	
	<input type="checkbox"/> N	Retain snags where feasible within safety standards.
*	<input type="checkbox"/> Y	

\*For planned unit check box if you want to be notified when unit will be laid out

SA 1900-1  
 (Rev. 3/88)



LAYOUT considerations (windthrow,  
future settings, etc.)  
C. clauses (Independent Sales)




Date: 8-4-77 Flight Line: 5 Roll: 376 Print # 68

↑ N  
True



Scale 1" = 1320'

Departures from original plan:

- 41
- LEGEND
-  CUTTING BOUNDARY
  -  SYSTEM ROAD
  -  SPUR ROAD



## UNIT LAYOUT CARD

Card Type: I Planned 10/88 by R.H. Burke  
 (Circle) Date IDT Leader/Timber Rep.  
 II Laid Out by  
 Date  
 III Modification by  
 Date

Sale Name APC SEIS  
 Unit No. 402-4  
 Acres 56  
 Vol/Acre 40.0 MBF  
 Total Vol 2,240 MBF  
 Alternative 2,3,4,5

Reviewed By \_\_\_\_\_ Date \_\_\_\_\_

Approved By \_\_\_\_\_ Date \_\_\_\_\_  
 District Ranger

VCU 402 Compartment 7 Stand Number(s) 151

DATE & INITIALS	REMARKS	For Laid Out & Modified Units: Are the impacts of the unit different than those anticipated in the EIS? If yes, explain.
	Cultural	
	<input type="checkbox"/> N	No cultural resource concerns.
*	<input type="checkbox"/> Y	
	Fisheries	
	<input type="checkbox"/> N	No Class I or II AHMUs within or approaching unit. No direct effect on fish habitat.
*	<input type="checkbox"/> Y	
	Lands	
	<input type="checkbox"/> N	No concerns.
*	<input type="checkbox"/> Y	
	Recreation	
	<input type="checkbox"/> N	No anticipated impacts to "recreation places".
*	<input type="checkbox"/> Y	
	Silviculture (should be last to review)	
	<input type="checkbox"/> N	Clearcut with natural regeneration and PCT.
*	<input type="checkbox"/> Y	
	Soils	
	<input type="checkbox"/> N	No apparent soil management problems.
*	<input type="checkbox"/> Y	
	Visual	
	<input type="checkbox"/> N	No visual resource concerns.
*	<input type="checkbox"/> Y	
	Water	
	<input type="checkbox"/> N	No mapped streams cross or directly border the unit. No anticipated water concerns.
*	<input type="checkbox"/> Y	
	Wildlife	
	<input type="checkbox"/> N	Impacts of the unit as planned are not different than those anticipated in the SEIS. No additional mitigation needed.
*	<input type="checkbox"/> Y	

\*For planned unit check box if you want to be notified when unit will be laid out

SA 1900-1  
 (Rev. 3/88)

Date: 8-4-77 Flight Line: 6 Roll: 376 Print # 105

Layout considerations (windthrow, future settings, etc.)

C. clauses (Independent Sales)

Locate spur so that switchback can be put in in the future to access timber to the east.

Departures from original plan:

↑ N  
True



## LEGEND

- CUTTING BOUNDARY
- SYSTEM ROAD
- SPUR ROAD

## UNIT LAYOUT CARD

Card Type: I Planned 10/88 by R.H. Burke  
 (Circle) II Laid Out Date IDT Leader/Timber Rep.  
 III Modification Date by

Sale Name APC SEIS  
 Unit No. 402-9  
 Acres 75  
 Vol/Acre 29.9 MBF  
 Total Vol 2,240 MBF  
 Alternative 4,5

Reviewed By \_\_\_\_\_ Date \_\_\_\_\_

Approved By \_\_\_\_\_ Date \_\_\_\_\_  
 District Ranger

VCU 402 Compartment 7 Stand Number(s) 169/175

DATE & INITIALS	REMARKS	For Laid Out & Modified Units: Are the impacts of the unit different than those anticipated in the EIS? If yes, explain.
	Cultural	
*	N	No cultural resource concerns.
	Y	
	Fisheries	
*	N	South side of planned unit approaches Brown's Creek above barriers. We plan to ladder barrier. Provide 100' Class I AHMU buffer. Wind firm buffe will protect fish habitat.
X	Y	
	Lands	
*	N	No concerns.
	Y	
	Recreation	
*	N	No anticipated impacts to "recreation places".
	Y	
	Silviculture (should be last to review)	
*	N	Clearcut with natural regeneration and PCT.
X	Y	
	Soils	
*	N	Keep north boundary of unit below over steepened slopes. (Less than 75%)
X	Y	
	Visual	
*	N	No visual resource concerns. Unit fits in well with existing visual condition of the area.
	Y	
	Water	
*	N	No mapped streams cross or directly border the unit. No anticipated water concerns, given planned buffer.
	Y	
	Wildlife	
*	N	Impacts of the unit as planned are not different than those anticipated in the SEIS. Retain snags where possible. Due to heavy adjacent harvest, consider post harvest improvmt projects
	Y	

\*For planned unit check box if you want to be notified when unit will be laid out

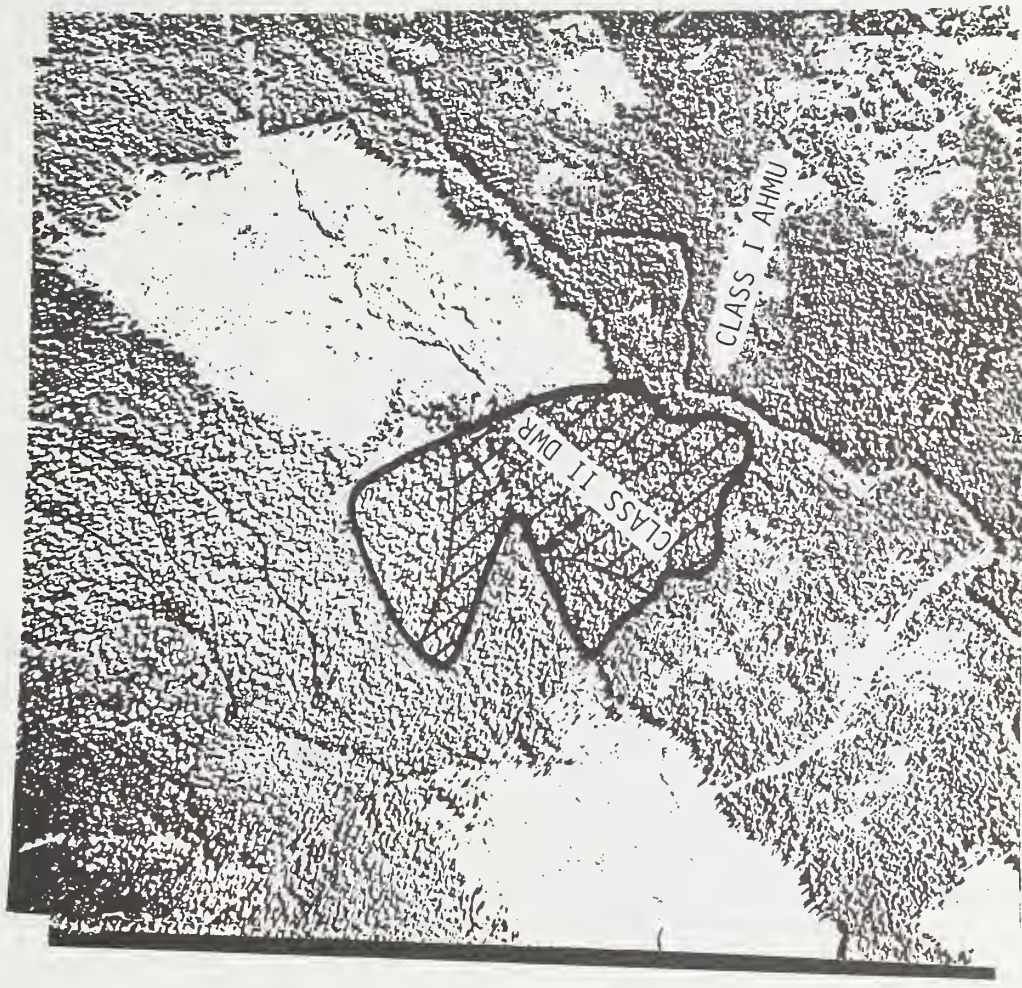
SA 1900-1  
 (Rev. 3/88)



Layout considerations (windthrow, future settings, etc.)  
C. clauses (Independent Sales)

Date: 8-4-77 Flight Line: 7 Roll: 476 Print # 137

↑ N  
True



Scale 1" = 1320'

Departures from original plan:

- LEGEND
- ✕ — ✕ CUTTING BOUNDARY
  - — — SYSTEM ROAD
  - — — SPUR ROAD

## UNIT LAYOUT CARD

Card Type: I Planned 10/88 by R.H. Burke  
 (Circle) Date IDT Leader/Timber Rep.  
 II Laid Out by  
 Date  
 III Modification by  
 Date

Sale Name APC SEIS  
 Unit No. 402-10, 15  
 Acres 55  
 Vol/Acre 40.0 MBF  
 Total Vol 2,200 MBF  
 Alternative 2,3,4,5

Reviewed By \_\_\_\_\_ Date \_\_\_\_\_

Approved By \_\_\_\_\_ Date \_\_\_\_\_  
 District Ranger

VCU 402 \_\_\_\_\_ Compartment 7 \_\_\_\_\_ Stand Number(s) 176 \_\_\_\_\_

DATE & INITIALS	REMARKS	For Laid Out & Modified Units: Are the impacts of the unit different than those anticipated in the EIS? If yes, explain.
	Cultural	
*	<input type="checkbox"/> N	No cultural resource concerns.
	<input type="checkbox"/> Y	
	Fisheries	
*	<input type="checkbox"/> N	Brown's Creek and a tributary are adjacent to units. Both require Class I AHMU prescriptions within 100' to protect fish habitat. Fish ladder will be built on tributary.
	<input type="checkbox"/> Y	
	Lands	
*	<input type="checkbox"/> N	No concerns.
	<input type="checkbox"/> Y	
	Recreation	
*	<input type="checkbox"/> N	No anticipated impacts to "recreation places".
	<input type="checkbox"/> Y	
	Silviculture (should be last to review)	
*	<input type="checkbox"/> N	Clearcut with natural regeneration and PCT.
	<input checked="" type="checkbox"/> Y	
	Soils	
*	<input type="checkbox"/> N	No apparent soil management problems.
	<input type="checkbox"/> Y	
	Visual	
*	<input type="checkbox"/> N	Unit will meet assigned VQO of Maximim Modification
	<input type="checkbox"/> Y	
	Water	
*	<input type="checkbox"/> N	Protect streambanks and LOD sources on Brown's Creek and tributary with AHMU prescriptions. No
	<input type="checkbox"/> Y	
	Wildlife	
*	<input type="checkbox"/> N	Protect riparian habitat by applying AHMU Rx along Brown's Ck and tributary. Biologist will check for active eagle nest during layout. Implement eagle mgt guidelines with 330' buffer if active nest is found.
	<input checked="" type="checkbox"/> Y	

\*For planned unit check box if you want to be notified when unit will be laid out

SA 1900-1  
 (Rev. 3/88)



Unit Number 402-10, 15

Layout considerations (windthrow,  
future settings, etc.)  
C. clauses (Independent Sales)

Project Area Map

Date: 8-4-77 Flight Line: 7 Roll: 476 Print # 138




↑  
N  
True



Scale 1" = 1320'

Departures from original plan:

LEGEND

-  CUTTING BOUNDARY
-  SYSTEM ROAD
-  SPUR ROAD



## UNIT LAYOUT CARD

Card Type: I Planned 10/88 by R.H. Burke  
 (Circle) II Laid Out Date IDT Leader/Timber Rep.  
 III Modification Date by

Sale Name APC SEIS  
 Unit No. 402-11  
 Acres 91  
 Vol/Acre 40.0 MBF  
 Total Vol 3,640 MBF  
 Alternative 2,3,4,5

Reviewed By \_\_\_\_\_ Date \_\_\_\_\_

Approved By \_\_\_\_\_ Date \_\_\_\_\_  
 District Ranger

VCU 402 Compartment 7 Stand Number(s) 182

DATE & INITIALS	REMARKS	For Laid Out & Modified Units: Are the impacts of the unit different than those anticipated in the EIS? If yes, explain.
	Cultural	
	<input type="checkbox"/> N	No cultural resource concerns.
*	<input type="checkbox"/> Y	
	Fisheries	
	<input type="checkbox"/> N	No Class I or II AHMUs within or approaching unit. No direct effect on fish habitat.
*	<input type="checkbox"/> Y	
X	Lands	
	<input type="checkbox"/> N	No concerns.
*	<input type="checkbox"/> Y	
	Recreation	
	<input type="checkbox"/> N	No anticipated impacts to "recreation places".
*	<input type="checkbox"/> Y	
	Silviculture (should be last to review)	
	<input type="checkbox"/> N	Clearcut with natural regeneration and PCT.
*	<input type="checkbox"/> Y	
X	Soils	
	<input type="checkbox"/> N	No apparent soil management problems.
*	<input type="checkbox"/> Y	Good site.
	Visual	
	<input type="checkbox"/> N	Unit will meet modification VQO as seen from Rowan Bay Camp and accessible portions of the bay.
*	<input type="checkbox"/> Y	
	Water	
	<input type="checkbox"/> N	No mapped streams cross or directly border the unit. No anticipated water concerns.
*	<input type="checkbox"/> Y	
	Wildlife	
	<input type="checkbox"/> N	Impacts of the unit as planned are not different than those anticipated in the SEIS. No additional mitigation needed.
*	<input type="checkbox"/> Y	

\*For planned unit check box if you want to be notified when unit will be laid out

SA 1900-1  
 (Rev. 3/88)

Layout considerations (windthrow,  
future settings, etc.)  
C. clauses (Independent Sales)  
Take southern cutting boundary  
to VCU boundary.

Date: 8-4-77 Flight Line: 7 Roll: 476 Print # 138





↑  
N  
True



Scale 1" = 1320'

Departures from original plan:

# LEGEND

  CUTTING BOUNDARY  
 SYSTEM ROAD  
 SPUR ROAD

## UNIT LAYOUT CARD

Card Type: I Planned 10/88 by R.H. Burke  
 (Circle) II Laid Out Date IDT Leader/Timber Rep.  
 III Modification Date by  
 Date

Sale Name APC SEIS  
 Unit No. 402-14  
 Acres 13  
 Vol/Acre 40.0 MBF  
 Total Vol 520 MBF  
 Alternative 2,3,4,5

Reviewed By \_\_\_\_\_ Date \_\_\_\_\_

Approved By \_\_\_\_\_ Date \_\_\_\_\_  
 District Ranger

VCU 402 Compartment 7 Stand Number(s) 198

DATE & INITIALS	REMARKS	For Laid Out & Modified Units: Are the impacts of the unit different than those anticipated in the EIS? If yes, explain.
	Cultural	
	<input type="checkbox"/> N	No cultural resource concerns.
*	<input type="checkbox"/> Y	
	Fisheries	
	<input type="checkbox"/> N	There is a Class II AHMU on west end of unit. Wind firm buffer required to protect fish habitat.
*	<input type="checkbox"/> Y	
	Lands	
	<input type="checkbox"/> N	No concerns.
*	<input type="checkbox"/> Y	
	Recreation	
	<input type="checkbox"/> N	No anticipated impacts to "recreation places".
*	<input type="checkbox"/> Y	
	Silviculture (should be last to review)	
	<input type="checkbox"/> N	Clearcut with natural regeneration and PCT.
*	<input type="checkbox"/> Y	
X	Soils	
	<input type="checkbox"/> N	Wet site below road. Need AHMU buffer along stream. Essentially a blowdown unit. No anticipated soil problems.
*	<input type="checkbox"/> Y	
	Visual	
	<input type="checkbox"/> N	No anticipated visual concerns.
*	<input type="checkbox"/> Y	
	Water	
	<input type="checkbox"/> N	Windfirm AHMU buffer will mitigate any potential water concerns.
*	<input type="checkbox"/> Y	
	Wildlife	
	<input type="checkbox"/> N	Impacts of the unit as planned are not different than those anticipated in the SEIS. No additional mitigation needed.
*	<input type="checkbox"/> Y	

\*For planned unit check box if you want to be notified when unit will be laid out

SA 1900-1



Unit Number 402-14

Layout considerations (windthrow,  
future settings, etc.)  
C. clauses (Independent Sales)

Take all blowdown.

Project Area Map

Date: 8-4-77 Flight Line: 8 Roll: 476 Print # 96

↑ N  
True



Scale 1" = 1320'

Departures from original plan:

LEGEND

	CUTTING BOUNDARY
	SYSTEM ROAD
	SPUR ROAD

## UNIT LAYOUT CARD

Sale Name APC SEIS  
 Unit No. 417-8  
 Acres 45  
 Vol/Acre 59.3 MBF  
 Total Vol 2,699 MBF  
 Alternative 3

Card Type: I Planned 10/88 by R.H. Burke  
 (Circle) Date IDT Leader/Timber Rep.  
 II Laid Out by \_\_\_\_\_  
 Date \_\_\_\_\_  
 III Modification by \_\_\_\_\_  
 Date \_\_\_\_\_

Reviewed By \_\_\_\_\_ Date \_\_\_\_\_

Approved By \_\_\_\_\_ Date \_\_\_\_\_  
 District Ranger

VCU 417 Compartment 19 Stand Number(s) 46

DATE & INITIALS	REMARKS	For Laid Out & Modified Units: Are the impacts of the unit different than those anticipated in the EIS? If yes, explain.
	Cultural	
	<input type="checkbox"/> N	Unit in low to moderate probability zone for cultural resources
*	<input type="checkbox"/> Y	Partial survey of unit required prior to harvest.
<input checked="" type="checkbox"/>	Fisheries	
	<input type="checkbox"/> N	No Class I or II AHMUs within or approaching unit. No direct effect on fish habitat.
*	<input type="checkbox"/> Y	
<input type="checkbox"/>	Lands	
	<input type="checkbox"/> N	No concerns.
*	<input type="checkbox"/> Y	
<input type="checkbox"/>	Recreation	
	<input type="checkbox"/> N	Unit will be visible from canoe/kayak protage. Size and shape of unit will mitigate impacts within viewshed.
*	<input type="checkbox"/> Y	
<input type="checkbox"/>	Silviculture (should be last to review)	
	<input type="checkbox"/> N	Clearcut with natural regeneration and PCT.
*	<input type="checkbox"/> Y	
<input checked="" type="checkbox"/>	Soils	
	<input type="checkbox"/> N	No apparent soil management problems.
*	<input type="checkbox"/> Y	
<input checked="" type="checkbox"/>	Visual	
	<input type="checkbox"/> N	No visual concern.
*	<input type="checkbox"/> Y	
<input type="checkbox"/>	Water	
	<input type="checkbox"/> N	No mapped streams cross or directly border the unit. No anticipated water concerns.
*	<input type="checkbox"/> Y	
<input type="checkbox"/>	Wildlife	
	<input type="checkbox"/> N	Impacts of the unit as planned are not different than those anticipated in the SEIS. Unit is in old growth deer winter range. Evaluate habitat improvement possibilities after harvest
*	<input type="checkbox"/> Y	

\*For planned unit check box if you want to be notified when unit will be laid out

SA 1900-1  
 (Rev. 3/88)

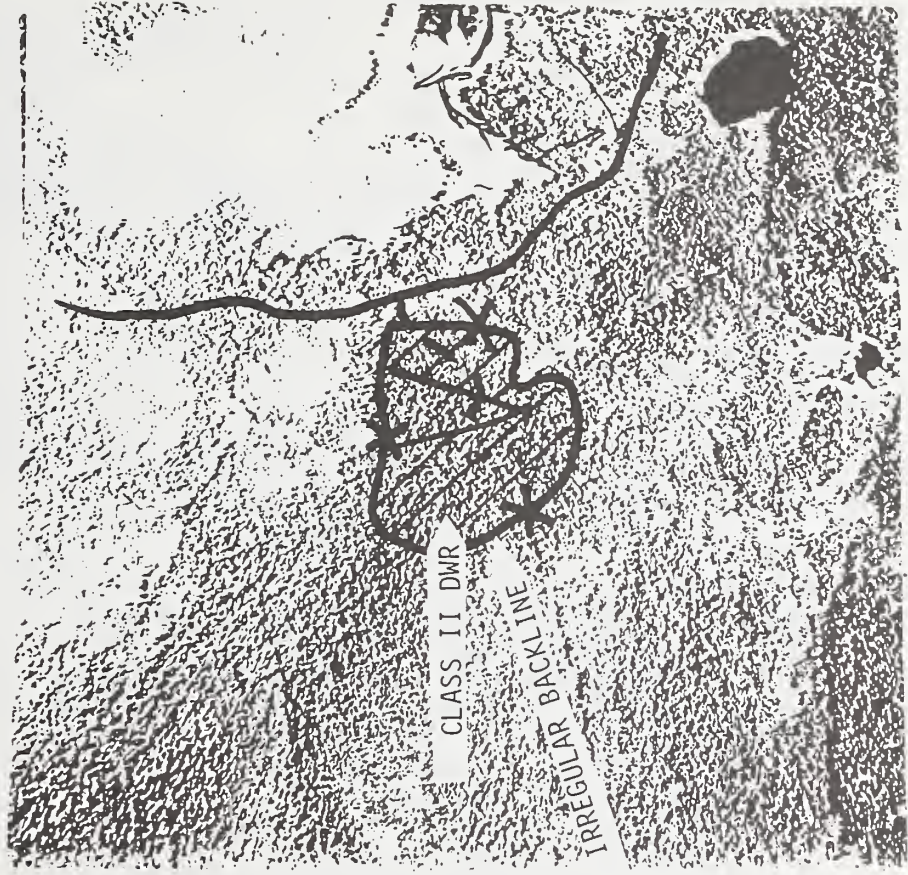


Layout considerations (windthrow, future settings, etc.)  
C. clauses (Independent Sales)

Project Area Map

Date: 8-4-77 Flight Line: 12 Roll: 576 Print # 177

↑  
N  
True



Scale 1" = 1320'

Departures from original plan:

- LEGEND
- CUTTING BOUNDARY
  - SYSTEM ROAD
  - SPUR ROAD



## UNIT LAYOUT CARD

Card Type: I Planned 10/88 by R.H. Burke  
 (Circle) II Laid Out Date IDT Leader/Timber Rep.  
 III Modification Date by  
 Date

Sale Name APC SEIS  
 Unit No. 417-10  
 Acres 10  
 Vol/Acre 13.7 MBF  
 Total Vol 137 MBF  
 Alternative 3

Reviewed By \_\_\_\_\_ Date \_\_\_\_\_

Approved By \_\_\_\_\_ Date \_\_\_\_\_  
 District Ranger

VCU 417 \_\_\_\_\_ Compartment 19 \_\_\_\_\_ Stand Number(s) 232 \_\_\_\_\_

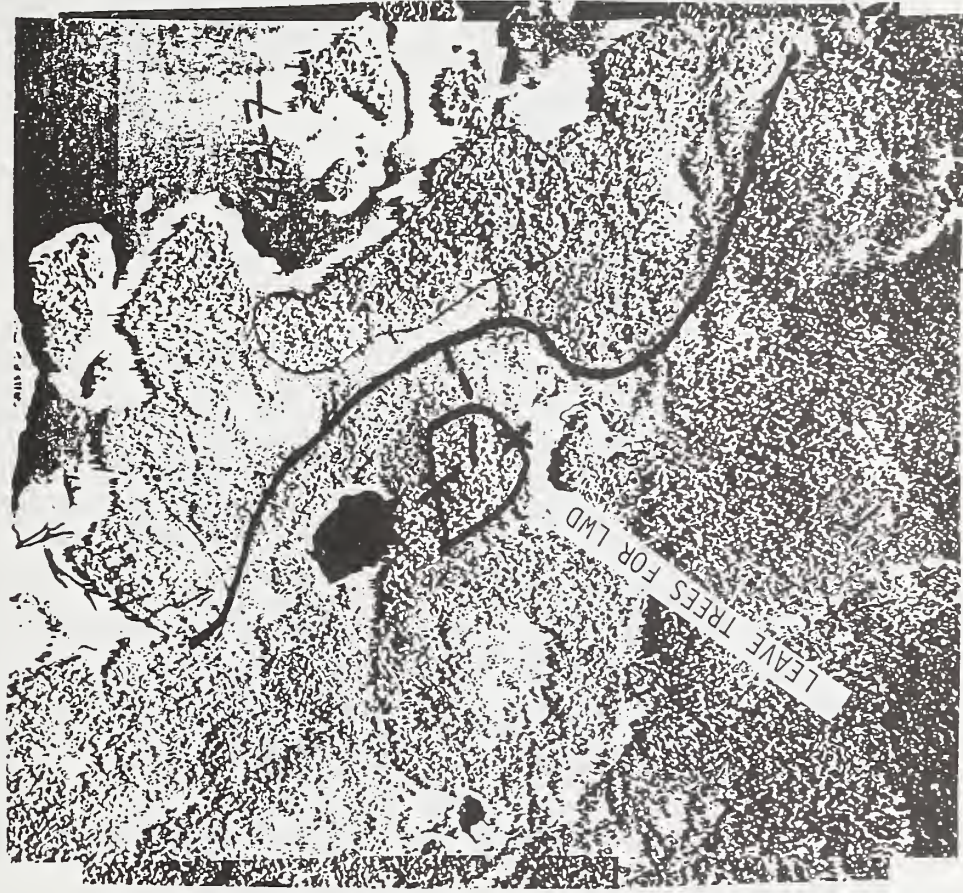
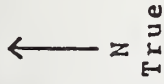
DATE & INITIALS	REMARKS	For Laid Out & Modified Units: Are the impacts of the unit different than those anticipated in the EIS? If yes, explain.
	Cultural	Unit is located in a low to moderate probability zone for cultural resources. Complete a partial survey prior to harvest
	<input type="checkbox"/> N	
*	<input checked="" type="checkbox"/> Y	
	Fisheries	Unit approaches a lake-like channel on the south side. LOD is a concern for this channel, but banks and floodplain should be protected by a 50' AHMU buffer.
	<input type="checkbox"/> N	
*	<input checked="" type="checkbox"/> Y	
	Lands	No concerns.
	<input type="checkbox"/> N	
*	<input type="checkbox"/> Y	
	Recreation	No anticipated impacts to "recreation places".
	<input type="checkbox"/> N	
*	<input type="checkbox"/> Y	
	Silviculture (should be last to review)	Clearcut with natural regeneration and PCT.
	<input type="checkbox"/> N	
*	<input checked="" type="checkbox"/> Y	
	Soils	No apparent soil management problems.
	<input type="checkbox"/> N	
*	<input type="checkbox"/> Y	
	Visual	Unit will meet assigned VQO of Maximim Modification
	<input type="checkbox"/> N	
*	<input type="checkbox"/> Y	
	Water	No mapped streams cross or directly border the unit. No anticipated water concerns.
	<input type="checkbox"/> N	
*	<input type="checkbox"/> Y	
	Wildlife	Impacts of the unit as planned are not different than those anticipated in the SEIS. No additional mitigation needed.
	<input type="checkbox"/> N	
*	<input type="checkbox"/> Y	

\*For planned unit check box if you want to be notified when unit will be laid out

SA 1900-1  
 (Rev. 3/88)

LAYOUT CONSIDERATIONS (WINDTHROW,  
FUTURE SETTINGS, ETC.)  
C. CLAUSES (INDEPENDENT SALES)

DATE: 8-4-77 FLIGHT LINE: 12 ROLL: 576 PRINT # 177



Scale 1" = 1320'

Departures from original plan:

- LEGEND
- CUTTING BOUNDARY
  - SYSTEM ROAD
  - SPUR ROAD

## UNIT LAYOUT CARD

Card Type: I Planned 10/88 by R.H. Burke  
 (Circle) II Laid Out Date IDT Leader/Timber Rep.  
 III Modification Date by

Sale Name APC SEIS  
 Unit No. 417-12  
 Acres 13  
 Vol/Acre 41.8 MBF  
 Total Vol 543 MBF  
 Alternative 3

Reviewed By \_\_\_\_\_ Date \_\_\_\_\_

Approved By \_\_\_\_\_ Date \_\_\_\_\_  
 District Ranger

VCU 417 Compartment 19 Stand Number(s) 239

DATE & INITIALS	REMARKS	For Laid Out & Modified Units: Are the impacts of the unit different than those anticipated in the EIS? If yes, explain.
	Cultural	
	<input type="checkbox"/> N	Unit is in a low to moderate probability zone for cultural resources. Complete a partial survey prior to harvest.
*	<input checked="" type="checkbox"/> Y	
	Fisheries	
	<input type="checkbox"/> N	Apply AHMU prescriptions within 100' of Class I stream. Wind firm buffer will provide protection for fish habitat.
*	<input type="checkbox"/> Y	
	Lands	
	<input type="checkbox"/> N	No concerns.
*	<input type="checkbox"/> Y	
	Recreation	
	<input type="checkbox"/> N	No anticipated impacts to "recreation places".
*	<input type="checkbox"/> Y	
	Silviculture (should be last to review)	
	<input type="checkbox"/> N	Clearcut with natural regeneration and PCT.
*	<input checked="" type="checkbox"/> Y	
	Soils	
	<input type="checkbox"/> N	No apparent soil management problems.
*	<input type="checkbox"/> Y	
	Visual	
	<input type="checkbox"/> N	Unit designed to maintain beach fringe to reduce overall visibility of unit.
*	<input type="checkbox"/> Y	
	Water	
	<input type="checkbox"/> N	No mapped streams cross or directly border the unit. No anticipated water concerns.
*	<input type="checkbox"/> Y	
	Wildlife	
	<input type="checkbox"/> N	Impacts of the unit as planned are not different than those anticipated in the SEIS. No additional mitigation needed.
*	<input type="checkbox"/> Y	

\*For planned unit check box if you want to be notified when unit will be laid out

SA 1900-1  
 (Rev. 3/88)



Unit Number 417-12

Project Area Map

LAYOUT CONSIDERATIONS (WINDTHROW,  
FUTURE SETTINGS, ETC.)  
C. CLAUSES (INDEPENDENT SALES)

DATE: 8-4-77 FLIGHT LINE: 12 ROLL: 576 PRINT # 177

↑  
N  
True



Scale 1" = 1320'

Departures from original plan:

LEGEND  
— X — CUTTING BOUNDARY  
— SYSTEM ROAD  
- - - SPUR ROAD

## UNIT LAYOUT CARD

Card Type: I Planned 10/88 by R.H. Burke  
 (Circle) Date IDT Leader/Timber Rep.  
 II Laid Out by  
 Date  
 III Modification by  
 Date

Sale Name APC SEIS  
 Unit No. 417-13  
 Acres 55  
 Vol/Acre 59.3 MBF  
 Total Vol 3,262 MBF  
 Alternative 3

Reviewed By \_\_\_\_\_ Date \_\_\_\_\_  
 Approved By \_\_\_\_\_ Date \_\_\_\_\_  
 District Ranger

VCU 417 Compartment 19 Stand Number(s) 241

DATE & INITIALS	REMARKS	For Laid Out & Modified Units: Are the impacts of the unit different than those anticipated in the EIS? If yes, explain.
	Cultural	
*	<input type="checkbox"/> N	No cultural resource concerns.
	<input type="checkbox"/> Y	
	Fisheries	
*	<input type="checkbox"/> N	No Class I or II AHMUs within or approaching unit. No direct effect on fish habitat.
	<input type="checkbox"/> Y	
	Lands	
*	<input type="checkbox"/> N	No concerns.
	<input type="checkbox"/> Y	
	Recreation	
*	<input type="checkbox"/> N	No anticipated impacts to "recreation places".
	<input type="checkbox"/> Y	
	Silviculture (should be last to review)	
*	<input type="checkbox"/> N	Clearcut with natural regeneration and PCT.
	<input checked="" type="checkbox"/> Y	
	Soils	
*	<input type="checkbox"/> N	No apparent soil management problems.
	<input type="checkbox"/> Y	
	Visual	
*	<input type="checkbox"/> N	Unit will meet assigned VQO of Maximim Modification
	<input type="checkbox"/> Y	
	Water	
*	<input type="checkbox"/> N	No mapped streams cross or directly border the unit. No anticipated water concerns.
	<input type="checkbox"/> Y	
	Wildlife	
*	<input type="checkbox"/> N	Impacts of the unit as planned are not different than those anticipated in the SEIS. No additional mitigation needed.
	<input type="checkbox"/> Y	

\*For planned unit check box if you want to be notified when unit will be laid out

SA 1900-1  
 (Rev. 3/88)



Unit Number 417-13

Layout considerations (windthrow,  
future settings, etc.)  
C. clauses (Independent Sales)

Project Area Map

Date: 8-4-77 Flight Line: 13 Roll: 676 Print # 33

↑  
N  
True



Departures from original plan:

LEGEND  
\*---\* CUTTING BOUNDARY  
--- SYSTEM ROAD  
--- SPUR ROAD

Scale 1" = 1320'



## UNIT LAYOUT CARD

Card Type: I Planned 10/88 by R.H. Burke  
 (Circle) II Laid Out Date IDT Leader/Timber Rep.  
 III Modification Date by

Sale Name APC SEIS  
 Unit No. 417-14  
 Acres 101  
 Vol/Acre 56.2 MBF  
 Total Vol 5,681 MBF  
 Alternative 3

Reviewed By \_\_\_\_\_ Date \_\_\_\_\_

Approved By \_\_\_\_\_ Date \_\_\_\_\_  
 District Ranger

VCU 417 Compartment 19 Stand Number(s) 242

DATE & INITIALS	REMARKS	For Laid Out & Modified Units: Are the impacts of the unit different than those anticipated in the EIS? If yes, explain.
	Cultural	
*	<input type="checkbox"/> N	No cultural resource concerns.
	<input type="checkbox"/> Y	
	Fisheries	
*	<input type="checkbox"/> N	Planned unit has Class II AHMU running through SE portion. Protect banks with a 100' AHMU buffer.
	<input checked="" type="checkbox"/> Y	
	Lands	
*	<input type="checkbox"/> N	No concerns.
	<input type="checkbox"/> Y	
	Recreation	
*	<input type="checkbox"/> N	No anticipated impacts to "recreation places".
	<input type="checkbox"/> Y	
	Silviculture (should be last to review)	
*	<input type="checkbox"/> N	Clearcut with natural regeneration and PCT.
	<input checked="" type="checkbox"/> Y	
	Soils	
*	<input type="checkbox"/> N	Apply AHMU Rx to protect streambanks. Recommend split line on streams.
	<input type="checkbox"/> Y	
	Visual	
*	<input type="checkbox"/> N	Unit will meet assigned VQO of Maximim Modification
	<input type="checkbox"/> Y	
	Water	
*	<input type="checkbox"/> N	Low gradient channel runs through SE section of unit. Protect streambanks by split line. Maintain future source of LOD 100' of streambank.
	<input type="checkbox"/> Y	
	Wildlife	
*	<input type="checkbox"/> N	Protect important riparian habitat by maintaining a wind firm buffer, 100' wide.
	<input type="checkbox"/> Y	

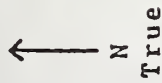
\*For planned unit check box if you want to be notified when unit will be laid out

SA 1900-1  
 (Rev. 3/88)

LAYOUT CONSIDERATIONS (WINDTHROW,  
FUTURE SETTINGS, ETC.)  
C. CLAUSES (INDEPENDENT SALES)




Intended to be only 100 acres.

Departures from original plan:



Scale 1" = 1320'

LEGEND

-  CUTTING BOUNDARY
-  SYSTEM ROAD
-  SPUR ROAD

# UNIT LAYOUT CARD

Card Type: I Planned 10/88 by R.H. Burke  
 (Circle) Date IDT Leader/Timber Rep.  
 II Laid Out by  
 Date  
 III Modification by  
 Date

Sale Name APC SEIS  
 Unit No. 417-15  
 Acres 51  
 Vol/Acre 59.3 MBF  
 Total Vol 3,024 MBF  
 Alternative 3

Reviewed By \_\_\_\_\_ Date \_\_\_\_\_

Approved By \_\_\_\_\_ Date \_\_\_\_\_  
 District Ranger

VCU 417 \_\_\_\_\_ Compartment 19 \_\_\_\_\_ Stand Number(s) 245 \_\_\_\_\_

DATE & INITIALS	REMARKS	For Laid Out & Modified Units: Are the impacts of the unit different than those anticipated in the EIS? If yes, explain.
	Cultural	
	<input type="checkbox"/> N	No cultural resource concerns.
*	<input type="checkbox"/> Y	
	Fisheries	
	<input type="checkbox"/> N	A Class II AHMU stream runs through the north end of the unit. Streambanks should be protected and LOD maintained by applying AHMY Rx within 100'. Up to 60% of the merchantable trees may selectively harvested.
*	<input type="checkbox"/> Y	
X	<input checked="" type="checkbox"/> Y	
	Lands	
	<input type="checkbox"/> N	No concerns.
*	<input type="checkbox"/> Y	
	Recreation	
	<input type="checkbox"/> N	No anticipated impacts to "recreation places".
*	<input type="checkbox"/> Y	
	Silviculture (should be last to review)	
	<input type="checkbox"/> N	Clearcut with natural regeneration and PCT.
*	<input type="checkbox"/> Y	
X	<input checked="" type="checkbox"/> Y	
	Soils	
	<input type="checkbox"/> N	No apparent soil management problems.
*	<input type="checkbox"/> Y	
	Visual	
	<input type="checkbox"/> N	Unit will meet assigned VQO of Maximim Modification
*	<input type="checkbox"/> Y	
	Water	
	<input type="checkbox"/> N	Protect streambanks and maintain future sources of LOD on in north west corner of unit.
*	<input type="checkbox"/> Y	
	Wildlife	
	<input type="checkbox"/> N	Impacts of the unit as planned are not different than those anticipated in the SEIS. AHMU buffer recommended for fish habitat will also protect riparian habitat.
*	<input type="checkbox"/> Y	

\*For planned unit check box if you want to be notified when unit will be laid out

SA 1900-1  
 (Rev. 3/88)



Layout considerations (windthrow,  
future settings, etc.)  
C. clauses (Independent Sales)

Date: 8-4-77 Flight Line: 14 Roll: 576 Print # 231

↑ N  
True



Scale 1" = 1320'

Departures from original plan:

- LEGEND
- CUTTING BOUNDARY
  - SYSTEM ROAD
  - SPUR ROAD

## UNIT LAYOUT CARD

Sale Name APC SEIS  
 Unit No. 417-16  
 Acres 80  
 Vol/Acre 59.3 MBF  
 Total Vol 4,744 MBF  
 Alternative 3

Card Type: I Planned 10/88 by R.H. Burke  
 (Circle) Date IDT Leader/Timber Rep.  
 II Laid Out by \_\_\_\_\_  
 Date \_\_\_\_\_  
 III Modification by \_\_\_\_\_  
 Date \_\_\_\_\_

Reviewed By \_\_\_\_\_ Date \_\_\_\_\_

Approved By \_\_\_\_\_ Date \_\_\_\_\_  
 District Ranger

VCU 417 Compartment 19 Stand Number(s) 249

DATE & INITIALS	REMARKS	For Laid Out & Modified Units: Are the impacts of the unit different than those anticipated in the EIS? If yes, explain.
	Cultural	
<input type="checkbox"/> *	<input type="checkbox"/> N	No cultural resource concerns.
<input type="checkbox"/> *	<input type="checkbox"/> Y	
	Fisheries	
<input type="checkbox"/> *	<input type="checkbox"/> N	No Class I or II AHMUs within or approaching unit. No direct effect on fish habitat.
<input type="checkbox"/> *	<input type="checkbox"/> Y	
	Lands	
<input type="checkbox"/> *	<input type="checkbox"/> N	No concerns.
<input type="checkbox"/> *	<input type="checkbox"/> Y	
	Recreation	
<input type="checkbox"/> *	<input type="checkbox"/> N	No anticipated impacts to "recreation places".
<input type="checkbox"/> *	<input type="checkbox"/> Y	
	Silviculture (should be last to review)	
<input type="checkbox"/> *	<input type="checkbox"/> N	Clearcut with natural regeneration and PCT.
<input checked="" type="checkbox"/> *	<input type="checkbox"/> Y	
	Soils	
<input type="checkbox"/> *	<input type="checkbox"/> N	No apparent soil management problems.
<input type="checkbox"/> *	<input type="checkbox"/> Y	
	Visual	
<input type="checkbox"/> *	<input type="checkbox"/> N	Broken topography. No visual concerns.
<input type="checkbox"/> *	<input type="checkbox"/> Y	
	Water	
<input type="checkbox"/> *	<input type="checkbox"/> N	No mapped streams cross or directly border the unit. No anticipated water concerns.
<input type="checkbox"/> *	<input type="checkbox"/> Y	
	Wildlife	
<input type="checkbox"/> *	<input type="checkbox"/> N	Impacts of the unit as planned are not different than those anticipated in the SEIS. No additional mitigation needed.
<input type="checkbox"/> *	<input type="checkbox"/> Y	

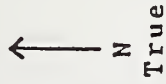
\*For planned unit check box if you want to be notified when unit will be laid out

SA 1900-1  
 (Rev. 3/88)



Layout considerations (windthrow,  
future settings, etc.)  
C. clauses (Independent Sales)

Date: 8-4-77 Flight Line: 14 Roll: 576 Print # 232



Departures from original plan:

LEGEND

- CUTTING BOUNDARY
- SYSTEM ROAD
- SPUR ROAD

Scale 1" = 1320'



Sale Name	APC SEIS
Unit No.	417-20
Acres	68
Vol/Acre	59.3 MBF
Total Vol	4,032 MBF
Alternative	3

Sale Name	APC SEIS
Unit No.	417-20
Acres	68
Vol/Acre	59.3 MBF
Total Vol	4,032 MBF
Alternative	3

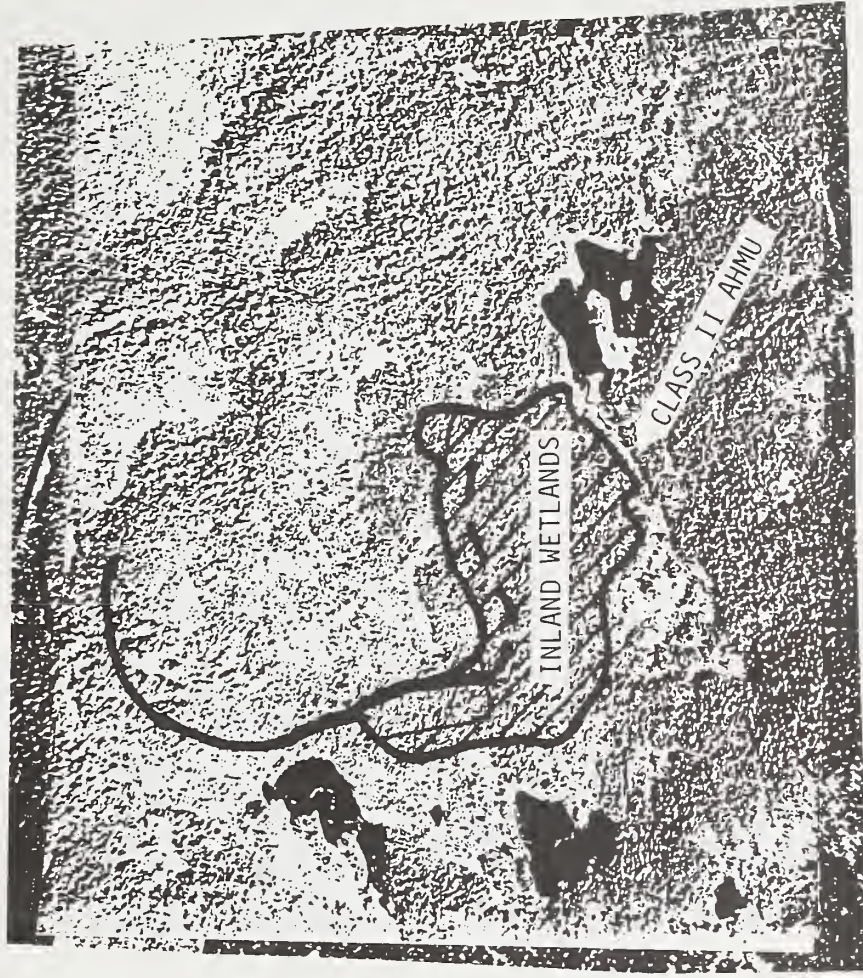
Approved By \_\_\_\_\_ Date \_\_\_\_\_  
District Ranger

DATE & INITIALS	REMARKS	For Laid Out & Modified Units: Are the impacts of the unit different than those anticipated in the EIS? If yes, explain.
	Cultural	
*	<input type="checkbox"/> N	No cultural resource concerns.
	<input type="checkbox"/> Y	
	Fisheries	
*	<input type="checkbox"/> N	Planned unit provides buffer on south side to protect direct Class II AHMU. 100' wind firm buffer will protect fish habitat
X	<input type="checkbox"/> Y	
	Lands	
*	<input type="checkbox"/> N	No concerns.
	<input type="checkbox"/> Y	
	Recreation	
*	<input type="checkbox"/> N	No anticipated impacts to "recreation places".
	<input type="checkbox"/> Y	
	Silviculture (should be last to review)	
*	<input type="checkbox"/> N	Clearcut with natural regeneration and PCT.
X	<input type="checkbox"/> Y	
	Soils	
*	<input type="checkbox"/> N	No apparent soil management problems.
	<input type="checkbox"/> Y	
	Visual	
*	<input type="checkbox"/> N	Unit will meet assigned VQO of Maximim Modification
	<input type="checkbox"/> Y	
	Water	
*	<input type="checkbox"/> N	A low gradient channel flows through SE corner of unit. Stream bank protection is needed and future sources of LOD should be protected through application of AHMU Rx.
	<input type="checkbox"/> Y	
	Wildlife	
*	<input type="checkbox"/> N	Impacts of the unit as planned are not different than those anticipated in the SEIS. No additional mitigation needed.
	<input type="checkbox"/> Y	

SA 1900-1  
(Rev. 3/88)

Layout considerations (windthrow,  
future settings, etc.)  
C. clauses (Independent Sales)


Date: 8-4-77 Flight Line: 14 Roll: 576 Print # 232



Departures from original plan:

Scale 1" = 1320'

LEGEND

-  CUTTING BOUNDARY
-  SYSTEM ROAD
-  SPUR ROAD

## UNIT LAYOUT CARD

Card Type: I Planned 10/88 by R.H. Burke  
 (Circle) II Laid Out Date IDT Leader/Timber Rep.  
 III Modification Date by  
 Date

Sale Name APC SEIS  
 Unit No. 417-21  
 Acres 33  
 Vol/Acre 24.8 MBF  
 Total Vol 818 MBF  
 Alternative 3

Reviewed By \_\_\_\_\_ Date \_\_\_\_\_

Approved By \_\_\_\_\_ Date \_\_\_\_\_  
 District Ranger

VCU 417 Compartment 19 Stand Number(s) 46

DATE & INITIALS	REMARKS	For Laid Out & Modified Units: Are the impacts of the unit different than those anticipated in the EIS? If yes, explain.
	Cultural	Unit is located in a low to moderate zone for cultural resource
	<input type="checkbox"/> N	Complete a partial survey along northern limits to insure no cultural resources will be impacted.
*	<input checked="" type="checkbox"/> Y	
	Fisheries	
	<input type="checkbox"/> N	No Class I or II AHMUs within or approaching unit. No direct effect on fish habitat.
*	<input type="checkbox"/> Y	
	Lands	
	<input type="checkbox"/> N	No concerns.
*	<input type="checkbox"/> Y	
	Recreation	
	<input type="checkbox"/> N	No anticipated impacts to "recreation places".
*	<input type="checkbox"/> Y	
	Silviculture (should be last to review)	
	<input type="checkbox"/> N	Clearcut with natural regeneration and PCT.
*	<input type="checkbox"/> Y	Full suspension at stream.
<input checked="" type="checkbox"/>	<input type="checkbox"/> Y	
	Soils	
	<input type="checkbox"/> N	Streambank protection needed. Full suspension across stream will provide effective mitigation.
*	<input type="checkbox"/> Y	
	Visual	
	<input type="checkbox"/> N	Unit will meet assigned VQO of Maximim Modification
*	<input type="checkbox"/> Y	
	Water	
	<input type="checkbox"/> N	A high gradient channel crosses through center of unit. Side slope protection is necessary. Full suspension will provide effective mitigation.
*	<input type="checkbox"/> Y	
	Wildlife	
	<input type="checkbox"/> N	Improve forage production in second growth habitat by thinning 20'x20' at 15 to 20 years. Establish transects and monitor forage production. Conduct eagle survey prior to harvestt and maintain 330' buffer around nests.
*	<input type="checkbox"/> Y	

\*For planned unit check box if you want to be notified when unit will be laid out

SA 1900-1  
 (Rev. 3/88)



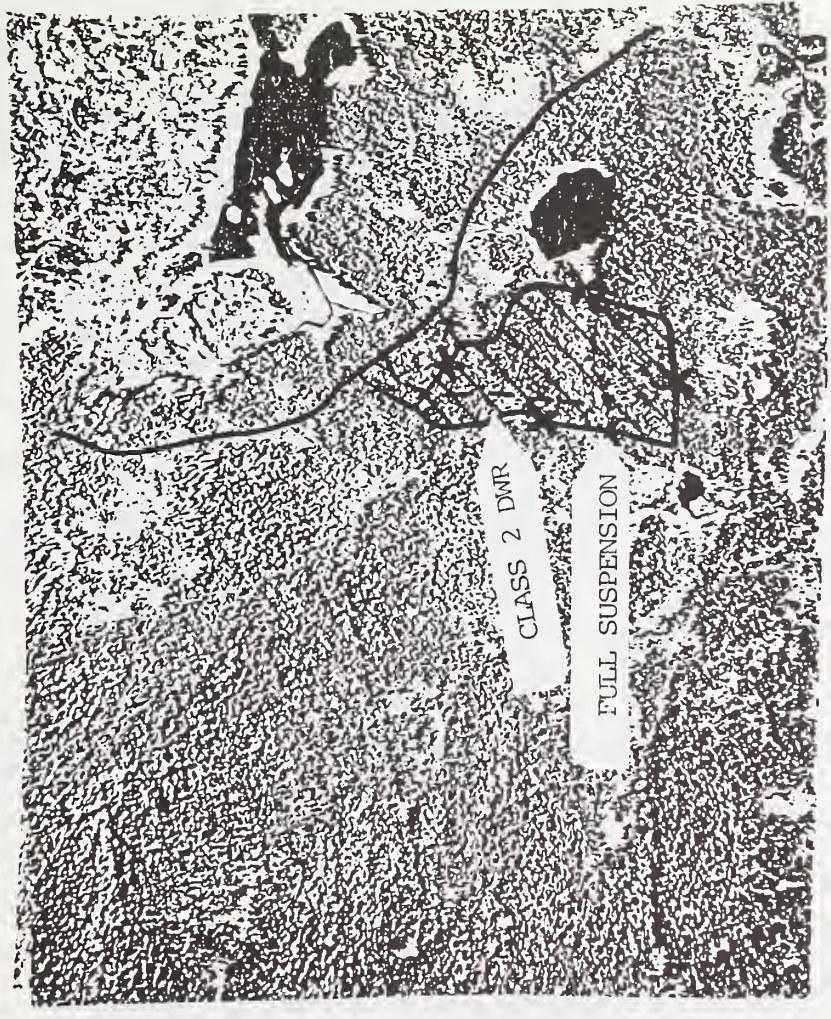
Unit Number 417-21

Layout considerations (windthrow,  
future settings, etc.)  
C. clauses (Independent Sales)

Project Area Map

Date: 8-4-77 Flight Line: 12 Roll: 576 Print # 1

↑  
N  
True



Departures from original plan:

Scale 1" = 1320'

LEGEND

- X— CUTTING BOUNDARY
- SYSTEM ROAD
- SPUR ROAD

## UNIT LAYOUT CARD

Sale Name APC SEIS  
 Unit No. 418-1  
 Acres 17  
 Vol/Acre 59.3 MBF  
 Total Vol 1,008 MBF  
 Alternative 3

Card Type: I Planned 10/88 by R.H. Burke  
 (Circle) Date IDT Leader/Timber Rep. by \_\_\_\_\_  
 II Laid Out \_\_\_\_\_ Date \_\_\_\_\_  
 III Modification \_\_\_\_\_ by \_\_\_\_\_  
 Date \_\_\_\_\_

Reviewed By \_\_\_\_\_ Date \_\_\_\_\_

Approved By \_\_\_\_\_ Date \_\_\_\_\_  
 District Ranger

VCU 418 Compartment 18 Stand Number(s) 122

DATE & INITIALS	REMARKS	For Laid Out & Modified Units: Are the impacts of the unit different than those anticipated in the EIS? If yes, explain.
	Cultural	
	<input type="checkbox"/> N	No cultural resource concerns.
*	<input type="checkbox"/> Y	
	Fisheries	
	<input type="checkbox"/> N	Class I AHMUs on west and east side of unit. 100' AHMU buffer required on both streams. Up to 20 of merchantable trees may be selectively harvested within buffer.
*	<input checked="" type="checkbox"/> Y	
	Lands	
	<input type="checkbox"/> N	No concerns.
*	<input type="checkbox"/> Y	
	Recreation	
	<input type="checkbox"/> N	No anticipated impacts to "recreation places".
*	<input type="checkbox"/> Y	
	Silviculture (should be last to review)	
	<input type="checkbox"/> N	Clearcut with natural regeneration and PCT.
*	<input checked="" type="checkbox"/> Y	
	Soils	
	<input type="checkbox"/> N	No apparent soil management problems. Good site.
*	<input type="checkbox"/> Y	
	Visual	
	<input type="checkbox"/> N	No visual concerns.
*	<input type="checkbox"/> Y	
	Water	
	<input type="checkbox"/> N	Low gradient stream follows east side of unit. Streambank protection and future sources of LOD to be maintained by applying AHMU Rx within 100' of stream banks.
*	<input type="checkbox"/> Y	
	Wildlife	
	<input type="checkbox"/> N	Impacts of the unit as planned are not different than those anticipated in the SEIS. Retention of wind firm buffer will protect wildlife habitat.
*	<input type="checkbox"/> Y	

\*For planned unit check box if you want to be notified when unit will be laid out

SA 1900-1  
 (Rev. 3/88)

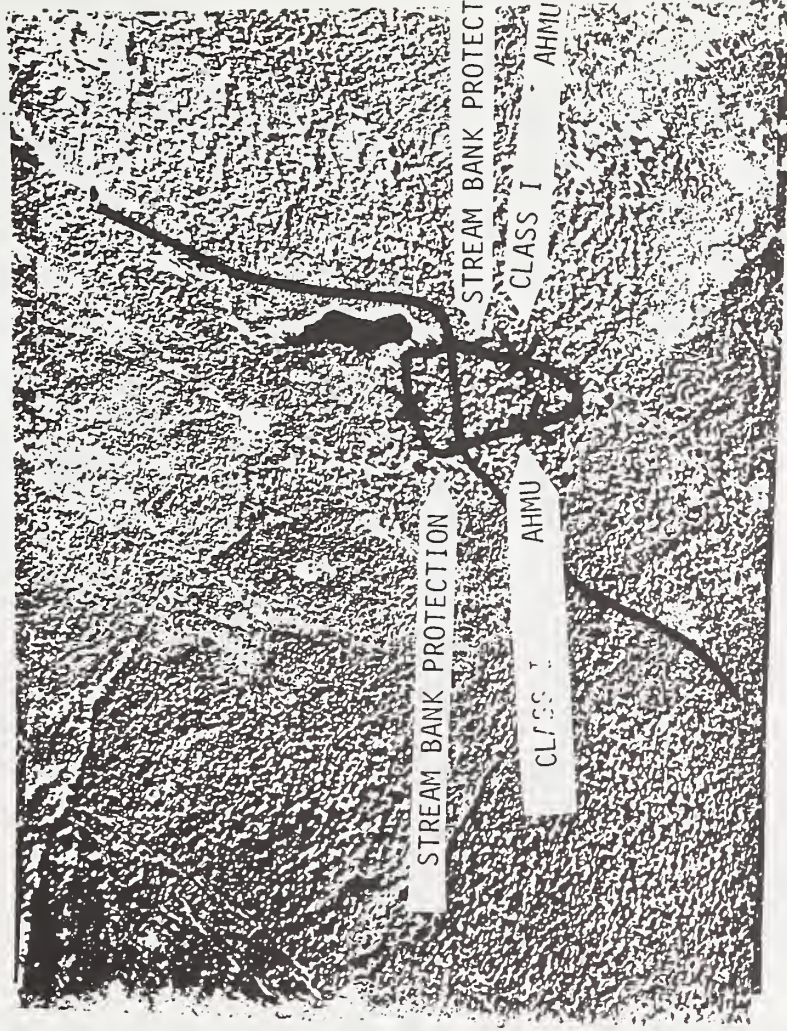


Unit Number 418-1

Layout considerations (windthrow,  
future settings, etc.)  
C. clauses (Independent Sales)

Project Area Map

Date: 8-4-77 Flight Line: 13 Roll: 676 Print # 39



Scale 1" = 1320'

Departures from original plan:

LEGEND

- CUTTING BOUNDARY
- SYSTEM ROAD
- SPUR ROAD



## UNIT LAYOUT CARD

Card Type: I Planned 10/88 by R.H. Burke  
 (Circle) II Laid Out Date IDT Leader/Timber Rep. by  
 III Modification Date by

Sale Name APC SEIS  
 Unit No. 418-2  
 Acres 93  
 Vol/Acre 59.3 MBF  
 Total Vol 5,515 MBF  
 Alternative 3

Reviewed By \_\_\_\_\_ Date \_\_\_\_\_

Approved By \_\_\_\_\_ Date \_\_\_\_\_  
 District Ranger

VCU 418 \_\_\_\_\_ Compartment 18 \_\_\_\_\_ Stand Number(s) 122, 123

DATE & INITIALS	REMARKS	For Laid Out & Modified Units: Are the impacts of the unit different than those anticipated in the EIS? If yes, explain.
	Cultural	
	<input type="checkbox"/> N	Low probability zone for cultural resources. No concerns.
*	<input type="checkbox"/> Y	
	Fisheries	
	<input type="checkbox"/> N	Hydrology and fisheries inventory are contradictory as to whether streams in unit are Class I or II. Need to field verify. Maintain wind firm buffers and protect LOD on both streams. Buffers will provide effective mitigation if windfirm
*	<input type="checkbox"/> Y	
	Lands	
	<input type="checkbox"/> N	No concerns.
*	<input type="checkbox"/> Y	
	Recreation	
	<input type="checkbox"/> N	No anticipated impacts to "recreation places".
*	<input type="checkbox"/> Y	
	Silviculture (should be last to review)	
	<input type="checkbox"/> N	Clearcut with natural regeneration and PCT.
*	<input type="checkbox"/> Y	
X	Soils	
	<input type="checkbox"/> N	Riparian (floodplain) vegetation (about 30 ac) on east side of unit will require partial suspension east of road. Partial suspension will provide effective mitigation.
*	<input type="checkbox"/> Y	
	Visual	
	<input type="checkbox"/> N	Unit is visible from Salt Lagoon and does not meet assigned VQO as has been noted in the SEIS.
*	<input type="checkbox"/> Y	
	Water	
	<input type="checkbox"/> N	Low gradient stream on south and east side of unit require streambank protection and maintenance of LOD sources. High gradient stream in center requires split line yarding.
*	<input type="checkbox"/> Y	
	Wildlife	
	<input type="checkbox"/> N	Impacts of the unit as planned are not different than those anticipated in the SEIS. No additional mitigation needed.
*	<input type="checkbox"/> Y	

\*For planned unit check box if you want to be notified when unit will be laid out

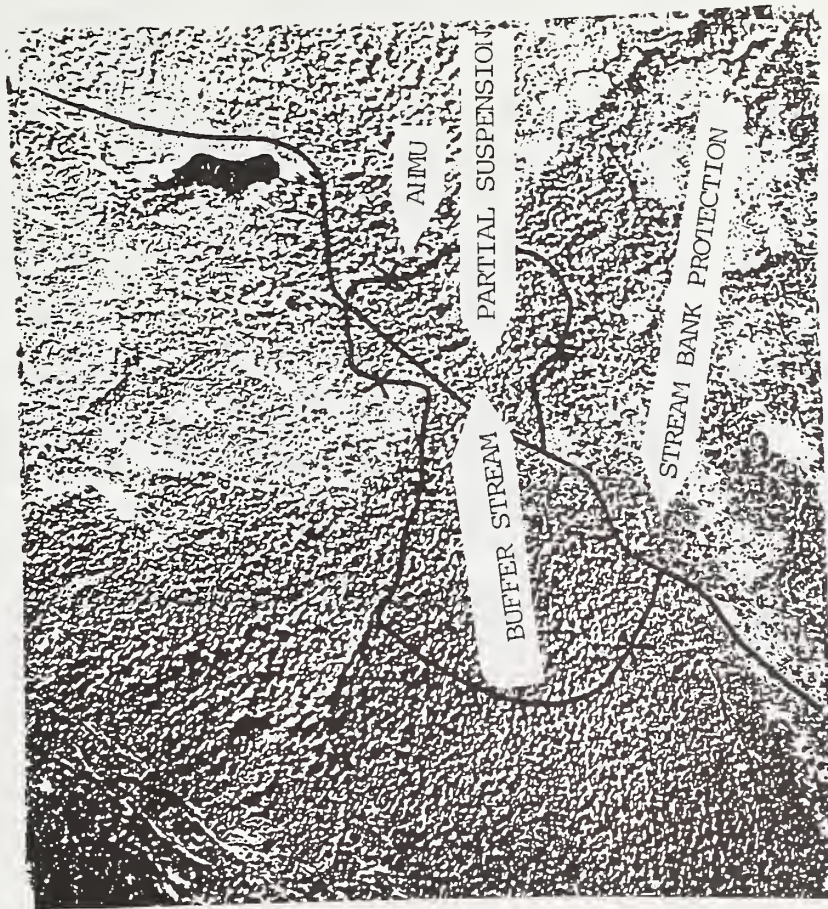
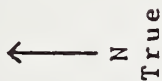
SA 1900-1  
 (Rev. 3/88)

Unit Number 418-2

Layout considerations (windthrow,  
future settings, etc.)  
C. clauses (Independent Sales)

Project Area Map




Date: 8-4-77 Flight Line: 13 Roll: 676 Print # 39



Scale 1" = 1320'

Departures from original plan:

LEGEND

-  CUTTING BOUNDARY
-  SYSTEM ROAD
-  SPUR ROAD

## UNIT LAYOUT CARD

Card Type: I Planned 10/88 by R.H. Burke  
 (Circle) Date IDT Leader/Timber Rep.  
 II Laid Out by  
 Date  
 III Modification by  
 Date

Sale Name APC SEIS  
 Unit No. 418-4  
 Acres 59  
 Vol/Acre 59.3 MBF  
 Total Vol 3,499 MBF  
 Alternative 3

Reviewed By \_\_\_\_\_ Date \_\_\_\_\_

Approved By \_\_\_\_\_ Date \_\_\_\_\_  
 District Ranger

VCU 418 Compartment 18 Stand Number(s) 104

DATE & INITIALS	REMARKS	For Laid Out & Modified Units: Are the impacts of the unit different than those anticipated in the EIS? If yes, explain.
	Cultural	
*	<input type="checkbox"/> N	No cultural resource concerns.
	<input type="checkbox"/> Y	
	Fisheries	
*	<input type="checkbox"/> N	No Class I or II AHMUs within or approaching unit. No direct effect on fish habitat.
	<input type="checkbox"/> Y	
	Lands	
*	<input type="checkbox"/> N	No concerns.
	<input type="checkbox"/> Y	
	Recreation	
*	<input type="checkbox"/> N	No anticipated impacts to "recreation places".
	<input type="checkbox"/> Y	
	Silviculture (should be last to review)	
*	<input type="checkbox"/> N	Clearcut with natural regeneration and PCT.
X	<input type="checkbox"/> Y	
	Soils	
*	<input type="checkbox"/> N	No apparent soil management problems. Deep well drained soils.
	<input type="checkbox"/> Y	
	Visual	
*	<input type="checkbox"/> N	Unit will meet assigned VQO of Maximim Modification
	<input type="checkbox"/> Y	
	Water	
*	<input type="checkbox"/> N	No mapped streams cross or directly border the unit. No anticipated water concerns.
	<input type="checkbox"/> Y	
	Wildlife	
*	<input type="checkbox"/> N	Impacts of the unit as planned are not different than those anticipated in the SEIS. No additional mitigation needed.
	<input type="checkbox"/> Y	

\*For planned unit check box if you want to be notified when unit will be laid out

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SA 1900-1  
 (Rev. 3/88)

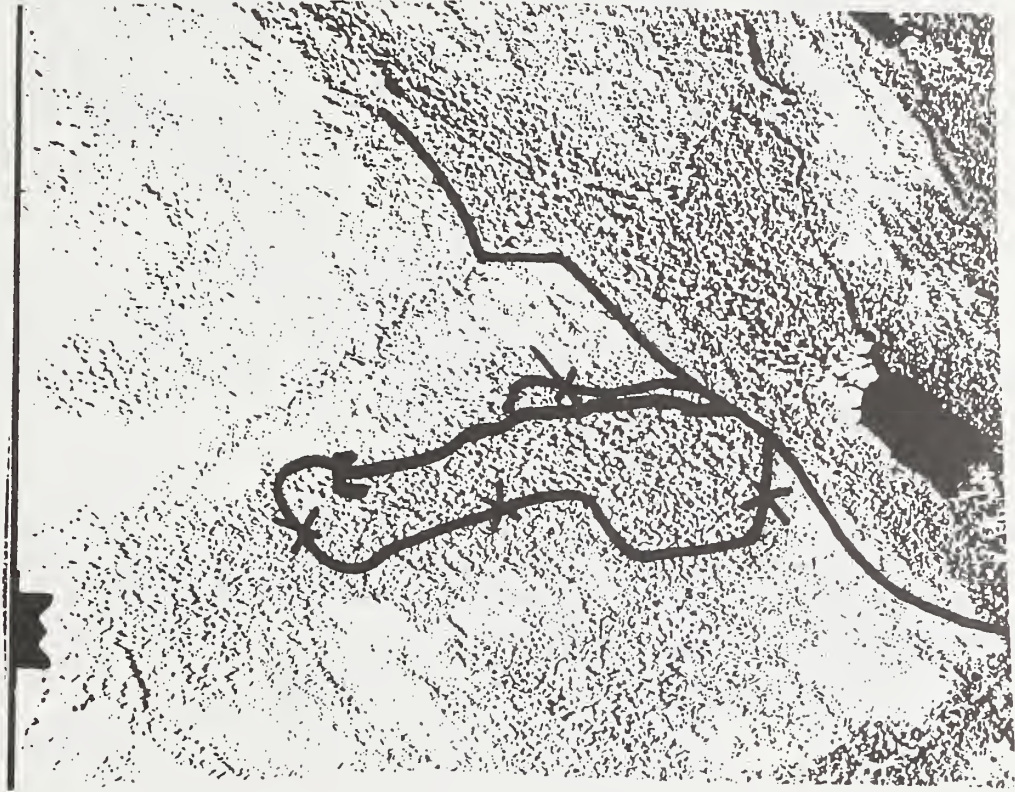
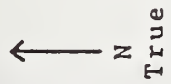


Layout considerations (windthrow, future settings, etc.)  
C. clauses (Independent Sales)

Put cutting line on VCU boundary.

Departures from original plan:

Date: 8-4-77 Flight Line: 12 Roll: 576 Print # 181



Scale 1" = 1320'

LEGEND

- CUTTING BOUNDARY
- SYSTEM ROAD
- SPUR ROAD

## UNIT LAYOUT CARD

Card Type: I Planned 10/88 by R.H. Burke  
 (Circle) II Laid Out Date IDT Leader/Timber Rep.  
 III Modification Date by  
 Date

Sale Name APC SEIS  
 Unit No. 418-5  
 Acres 18  
 Vol/Acre 59.3 MBF  
 Total Vol 932 MBF  
 Alternative 3

Reviewed By \_\_\_\_\_ Date \_\_\_\_\_

Approved By \_\_\_\_\_ Date \_\_\_\_\_  
 District Ranger

VCU 418 Compartment 18 Stand Number(s) 124

DATE & INITIALS	REMARKS	For Laid Out & Modified Units: Are the impacts of the unit different than those anticipated in the EIS? If yes, explain.
	Cultural	
	<input type="checkbox"/> N	No cultural resource concerns.
*	<input type="checkbox"/> Y	
	Fisheries	
	<input type="checkbox"/> N	Planned unit provides buffer on SW side between Class I AHMU. A 100' wind-firm buffer will protect fish habitat.
*	<input checked="" type="checkbox"/> Y	
	Lands	
	<input type="checkbox"/> N	No concerns.
*	<input type="checkbox"/> Y	
	Recreation	
	<input type="checkbox"/> N	No anticipated impacts to "recreation places".
*	<input type="checkbox"/> Y	
	Silviculture (should be last to review)	
	<input type="checkbox"/> N	Clearcut with natural regeneration and PCT.
*	<input checked="" type="checkbox"/> Y	
	Soils	
	<input type="checkbox"/> N	Leave strip on incised drainage needs to be wind-firm. If not, consider combining units with V-notch as split line.
*	<input checked="" type="checkbox"/> Y	
	Visual	
	<input type="checkbox"/> N	No visual concerns.
*	<input type="checkbox"/> Y	
	Water	
	<input type="checkbox"/> N	No mapped streams cross or directly border the unit. No anticipated water concerns, given buffer planned on SW side.
*	<input type="checkbox"/> Y	
	Wildlife	
	<input type="checkbox"/> N	Impacts of the unit as planned are not different than those anticipated in the SEIS. No additional mitigation needed.
*	<input type="checkbox"/> Y	

\*For planned unit check box if you want to be notified when unit will be laid out

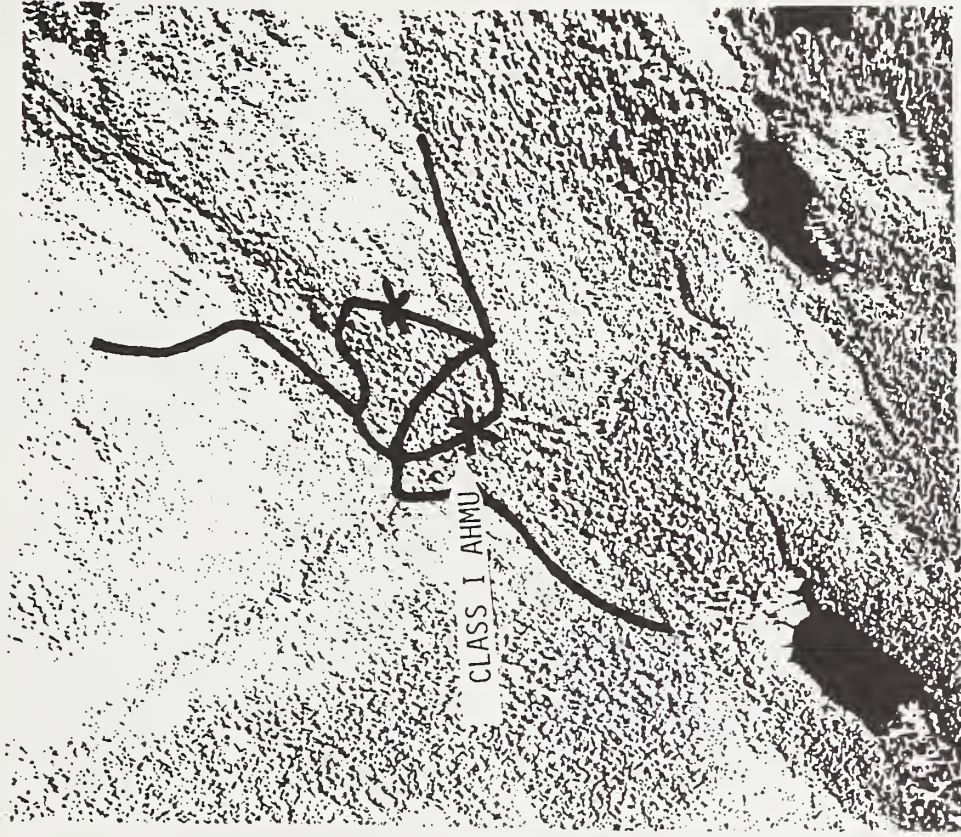
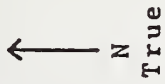
SA 1900-1  
 (Rev. 3/88)

Unit Number 418-5

Layout considerations (windthrow,  
future settings, etc.)  
C. clauses (Independent Sales)

Project Area Map

Date: 8-4-77 Flight Line: 12 Roll: 576 Print # 181



Scale 1" = 1320'

Departures from original plan:

- 77.
- LEGEND
- CUTTING BOUNDARY
  - SYSTEM ROAD
  - SPUR ROAD



## UNIT LAYOUT CARD

Card Type: I Planned 10/88 by R.H. Burke  
 (Circle) Date IDT Leader/Timber Rep.  
 II Laid Out by  
 Date  
 III Modification by  
 Date

Sale Name APC SEIS  
 Unit No. 418-6  
 Acres 19  
 Vol/Acre 59.3 MBF  
 Total Vol 1,067 MBF  
 Alternative 3

Reviewed By \_\_\_\_\_ Date \_\_\_\_\_

Approved By \_\_\_\_\_ Date \_\_\_\_\_  
 District Ranger

VCU 418 Compartment 18 Stand Number(s) 124

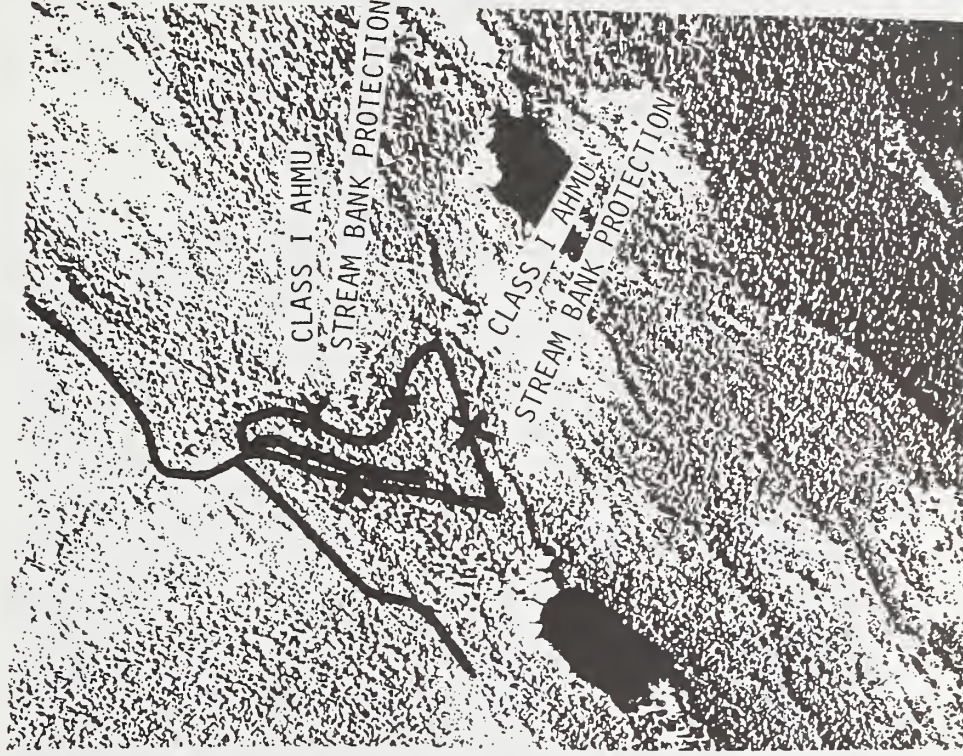
DATE & INITIALS	REMARKS	For Laid Out & Modified Units: Are the impacts of the unit different than those anticipated in the EIS? If yes, explain.
	Cultural	
	<input type="checkbox"/> N	No cultural resource concerns.
*	<input type="checkbox"/> Y	
	Fisheries	
	<input type="checkbox"/> N	Planned unit will provide a buffer on south and east side between Class I AHMUs. Wind-firm buffers will provide protection for fish habitat.
*	<input type="checkbox"/> Y	
	Lands	
	<input type="checkbox"/> N	No concerns.
*	<input type="checkbox"/> Y	
	Recreation	
	<input type="checkbox"/> N	No anticipated impacts to "recreation places".
*	<input type="checkbox"/> Y	
	Silviculture (should be last to review)	
	<input type="checkbox"/> N	Clearcut with natural regeneration and PCT.
*	<input type="checkbox"/> Y	
X	Soils	
	<input type="checkbox"/> N	No apparent soil management problems.
*	<input type="checkbox"/> Y	
	Visual	
	<input type="checkbox"/> N	Unit will meet assigned VQO of Maximim Modification
*	<input type="checkbox"/> Y	
	Water	
	<input type="checkbox"/> N	Buffers will provide streambank protection and protect future sources of LOD for streams on S and E sides of unit.
*	<input type="checkbox"/> Y	
	Wildlife	
	<input type="checkbox"/> N	Impacts of the unit as planned are not different than those anticipated in the SEIS. Wind-firm buffers on south and east sides of unit will protect riparian habitat.
*	<input type="checkbox"/> Y	

\*For planned unit check box if you want to be notified when unit will be laid out

SA 1900-1  
 (Rev. 3/88)

Layout considerations (windthrow, future settings, etc.)  
C. clauses (Independent Sales)  
Take all the timber that is not on the flood plain or close to the creek.

Date: 8-4-77 Flight Line: 12 Roll: 576 Print # 181



Departures from original plan:

- LEGEND
- CUTTING BOUNDARY
  - SYSTEM ROAD
  - SPUR ROAD

Scale 1" = 1320'

## UNIT LAYOUT CARD

Sale Name APC SEIS  
 Unit No. 419-12  
 Acres 32  
 Vol/Acre 40.0 MBF  
 Total Vol 1,280 MBF  
 Alternative 5

Card Type: I Planned 10/88 by R.H. Burke  
 (Circle) Date IDT Leader/Timber Rep. by  
 II Laid Out by  
 Date by  
 III Modification by  
 Date by

Reviewed By \_\_\_\_\_ Date \_\_\_\_\_

Approved By \_\_\_\_\_ Date \_\_\_\_\_  
 District Ranger

VCU 419 Compartment 13 Stand Number(s) 35

DATE & INITIALS	REMARKS	For Laid Out & Modified Units: Are the impacts of the unit different than those anticipated in the EIS? If yes, explain.
	Cultural	
	<input type="checkbox"/> N	No cultural resource concerns.
*	<input type="checkbox"/> Y	
	Fisheries	
	<input type="checkbox"/> N	Unit as planned will leave a buffer on the west boundry between unit and Class I AHMU. Win-firm buffer will protect fish habitat.
*	<input checked="" type="checkbox"/> Y	
	Lands	
	<input type="checkbox"/> N	No concerns.
*	<input type="checkbox"/> Y	
	Recreation	
	<input type="checkbox"/> N	No anticipated impacts to "recreation places".
*	<input type="checkbox"/> Y	
	Silviculture (should be last to review)	
	<input type="checkbox"/> N	Clearcut with natural regeneration and PCT.
*	<input checked="" type="checkbox"/> Y	
	Soils	
	<input type="checkbox"/> N	No apparent soil management problems.
*	<input type="checkbox"/> Y	
	Visual	
	<input type="checkbox"/> N	Unit will meet assigned VQO of Maximim Modification
*	<input type="checkbox"/> Y	
	Water	
	<input type="checkbox"/> N	Unit borders a low gradient stream on west side. a buffer will protect streambank stability and future sources of LOD.
*	<input type="checkbox"/> Y	
	Wildlife	
	<input type="checkbox"/> N	Unit kept small and spaced to maintain thermal cover for deer. Consider seasonal road closure to protect waterfowl. Survey for eagle nests. Protect nests with 330' buffers and control timing of harvest activities as per eagle mgt guidelines.
*	<input checked="" type="checkbox"/> Y	

\*For planned unit check box if you want to be notified when unit will be laid out

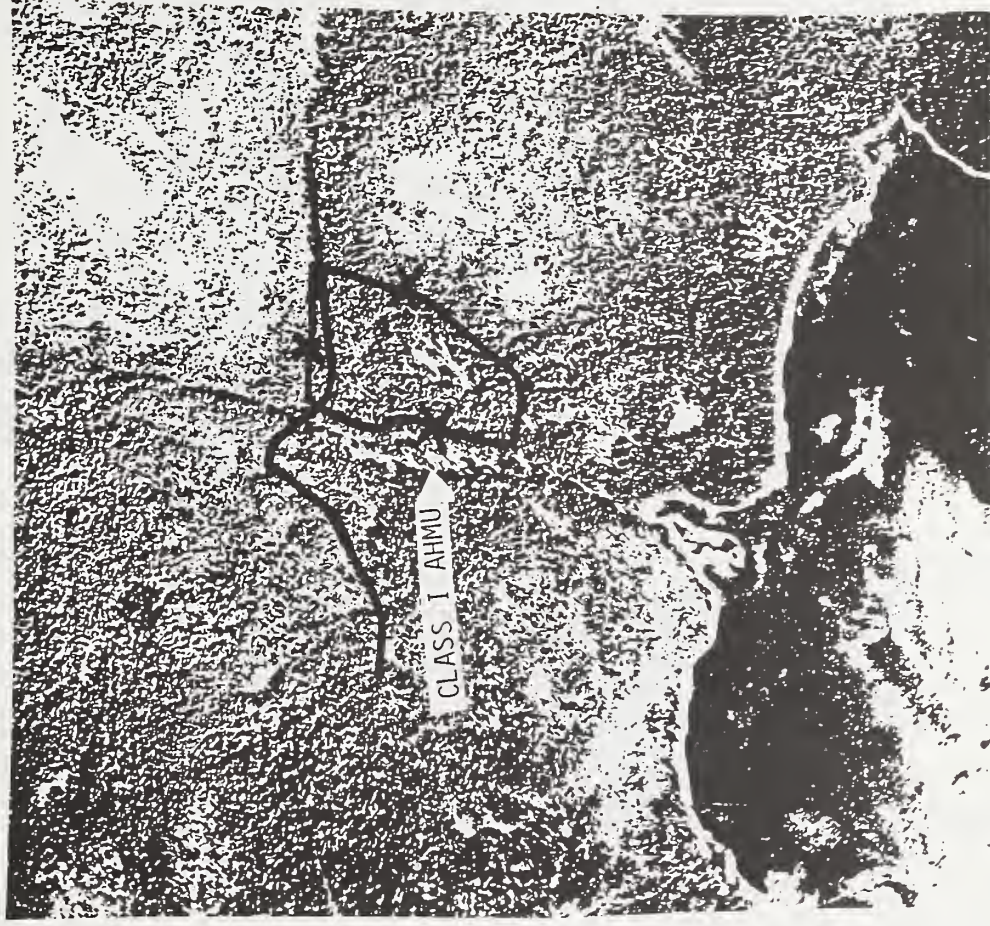
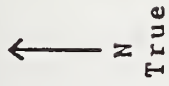
SA 1900-1  
 (Rev. 3/88)



Layout considerations (windthrow,  
future settings, etc.)  
C. clauses (Independent Sales)




Date: 8-4-77 Flight Line: 16 Roll: 676 Print # 102

Project Area Map



Scale 1" = 1320'

Departures from original plan:

- LEGEND
-  CUTTING BOUNDARY
  -  SYSTEM ROAD
  -  SPUR ROAD

## UNIT LAYOUT CARD

Card Type: I Planned 10/88 by R.H. Burke  
 (Circle) II Laid Out Date IDT Leader/Timber Rep.  
 III Modification Date by  
 Date

Sale Name APC SEIS  
 Unit No. 419-13  
 Acres 28  
 Vol/Acre 40.0 MBF  
 Total Vol 1,120 MBF  
 Alternative 5

Reviewed By \_\_\_\_\_ Date \_\_\_\_\_

Approved By \_\_\_\_\_ Date \_\_\_\_\_  
 District Ranger

VCU 419 Compartment 13 Stand Number(s) 225

DATE & INITIALS	REMARKS	For Laid Out & Modified Units: Are the impacts of the unit different than those anticipated in the EIS? If yes, explain.
	Cultural	
	<input type="checkbox"/> N	No cultural resource concerns.
*	<input type="checkbox"/> Y	
	Fisheries	
	<input type="checkbox"/> N	Unit as planned will leave a buffer on the east boundry
*	<input type="checkbox"/> Y	between unit and Class I AHMU. Win-firm buffer will protect
	<input checked="" type="checkbox"/> Y	fish habitat.
	Lands	
	<input type="checkbox"/> N	No concerns.
*	<input type="checkbox"/> Y	
	Recreation	
	<input type="checkbox"/> N	No anticipated impacts to "recreation places".
*	<input type="checkbox"/> Y	
	Silviculture (should be last to review)	
	<input type="checkbox"/> N	Clearcut with natural regeneration and PCT.
*	<input type="checkbox"/> Y	
	Soils	
	<input type="checkbox"/> N	No apparent soil management problems.
*	<input type="checkbox"/> Y	
	Visual	
	<input type="checkbox"/> N	Unit will meet assigned VQO of Maximim Modification
*	<input type="checkbox"/> Y	
	Water	
	<input type="checkbox"/> N	Unit borders a low gradient stream on east side. A buffer will
*	<input type="checkbox"/> Y	protect streambank stability and future sources of LOD.
	Wildlife	
	<input type="checkbox"/> N	Unit kept small and spaced to maintain thermal cover for deer.
*	<input type="checkbox"/> Y	Consider seasonal road closure to protect waterfowl. Survey
	<input checked="" type="checkbox"/> Y	for eagle nests. Protect nests with 330' buffers and control
		timing of harvest activities as per eagle mgt guidelines.

\*For planned unit check box if you want to be notified when unit will be laid out

SA 1900-1  
 (Rev. 3/88)



Layout considerations (windthrow,  
future settings, etc.)  
C. clauses (Independent Sales)

Take all merchantable timber except  
along stream.

Departures from original plan:

Date: 8-4-77

Flight Line: 16

Roll: 676




Print # 102

↑ N  
True



Scale 1" = 1320'

## LEGEND

-  CUTTING BOUNDARY  
 SYSTEM ROAD  
 SPUR ROAD



## UNIT LAYOUT CARD

Card Type: I Planned 10/88 by R.H. Burke  
 (Circle) Date IDT Leader/Timber Rep.  
 II Laid Out by  
 Date  
 III Modification by  
 Date

Sale Name APC SEIS  
 Unit No. 419-14  
 Acres 9  
 Vol/Acre 24.8 MBF  
 Total Vol 223 MBF  
 Alternative 5

Reviewed By \_\_\_\_\_ Date \_\_\_\_\_

Approved By \_\_\_\_\_ Date \_\_\_\_\_

District Ranger

VCU 419 Compartment 13 Stand Number(s) 35

DATE & INITIALS	REMARKS	For Laid Out & Modified Units: Are the impacts of the unit different than those anticipated in the EIS? If yes, explain.
	Cultural	
	<input type="checkbox"/> N	No cultural resource concerns.
*	<input type="checkbox"/> Y	
	Fisheries	
	<input type="checkbox"/> N	Planned unit will approach a Class I AHMU on NE side. This is a lake-like channel and LOD is not critical. Protect stream-banks and floodplain with 50' buffer.
*	<input checked="" type="checkbox"/> Y	
	Lands	
	<input type="checkbox"/> N	No concerns.
*	<input type="checkbox"/> Y	
	Recreation	
	<input type="checkbox"/> N	No anticipated impacts to "recreation places".
*	<input type="checkbox"/> Y	
	Silviculture (should be last to review)	
	<input type="checkbox"/> N	Clearcut with natural regeneration and PCT.
*	<input checked="" type="checkbox"/> Y	
	Soils	
	<input type="checkbox"/> N	No apparent soil management problems.
*	<input type="checkbox"/> Y	
	Visual	
	<input type="checkbox"/> N	Unit will meet assigned VQO of Maximim Modification
*	<input type="checkbox"/> Y	
	Water	
	<input type="checkbox"/> N	Unit borders a low gradient stream on N.E. side. A buffer will protect streambank and floodplain stability.
*	<input type="checkbox"/> Y	
	Wildlife	
	<input type="checkbox"/> N	Unit kept small and spaced to maintain thermal cover for deer. Consider seasonal road closure to protect waterfowl. Survey for eagle nests. Protect nests with 330' buffers and control timing of harvest activities as per eagle mgt guidelines.
*	<input checked="" type="checkbox"/> Y	

\*For planned unit check box if you want to be notified when unit will be laid out

SA 1900-1  
 (Rev. 3/88)

Layout considerations (windthrow,  
future settings, etc.)  
C. clauses (Independent Sales)

Date: 8-4-77 Flight Line: 16 Roll: 676 Print # 102



Departures from original plan:

- LEGEND
- CUTTING BOUNDARY
  - SYSTEM ROAD
  - SPUR ROAD

Scale 1" = 1320'

## UNIT LAYOUT CARD

Card Type: I Planned 10/88 by R.H. Burke  
 (Circle) II Laid Out Date IDT Leader/Timber Rep.  
 III Modification Date by  
 Date

Sale Name APC SEIS  
 Unit No. 419-15  
 Acres 21  
 Vol/Acre 24.8 MBF  
 Total Vol 521 MBF  
 Alternative 5

Reviewed By \_\_\_\_\_ Date \_\_\_\_\_

Approved By \_\_\_\_\_ Date \_\_\_\_\_  
 District Ranger

VCU 419 \_\_\_\_\_ Compartment 13 \_\_\_\_\_ Stand Number(s) 31 \_\_\_\_\_

DATE & INITIALS	REMARKS	For Laid Out & Modified Units: Are the impacts of the unit different than those anticipated in the EIS? If yes, explain.
	Cultural	
	<input type="checkbox"/> N	No cultural resource concerns.
*	<input type="checkbox"/> Y	
	Fisheries	
	<input type="checkbox"/> N	Unit as planned will leave a buffer on the N & E sides between unit and Class I AHMU. Wind-firm 100' buffer will protect fish habitat.
*	<input checked="" type="checkbox"/> Y	
	Lands	
	<input type="checkbox"/> N	No concerns.
*	<input type="checkbox"/> Y	
	Recreation	
	<input type="checkbox"/> N	No anticipated impacts to "recreation places".
*	<input type="checkbox"/> Y	
	Silviculture (should be last to review)	
	<input type="checkbox"/> N	Clearcut with natural regeneration and PCT.
*	<input checked="" type="checkbox"/> Y	
	Soils	
	<input type="checkbox"/> N	No apparent soil management problems.
*	<input type="checkbox"/> Y	
	Visual	
	<input type="checkbox"/> N	No visual concerns.
*	<input type="checkbox"/> Y	
	Water	
	<input type="checkbox"/> N	A low gradient channel crosses center of unit. A buffer will protect streambank stability and future sources of LOD.
*	<input type="checkbox"/> Y	
	Wildlife	
	<input type="checkbox"/> N	Unit kept small and spaced to maintain thermal cover for deer. Consider seasonal road closure to protect waterfowl. Survey for eagle nests. Protect nests with 330' buffers and control timing of harvest activities as per eagle mgt guidelines.
*	<input checked="" type="checkbox"/> Y	

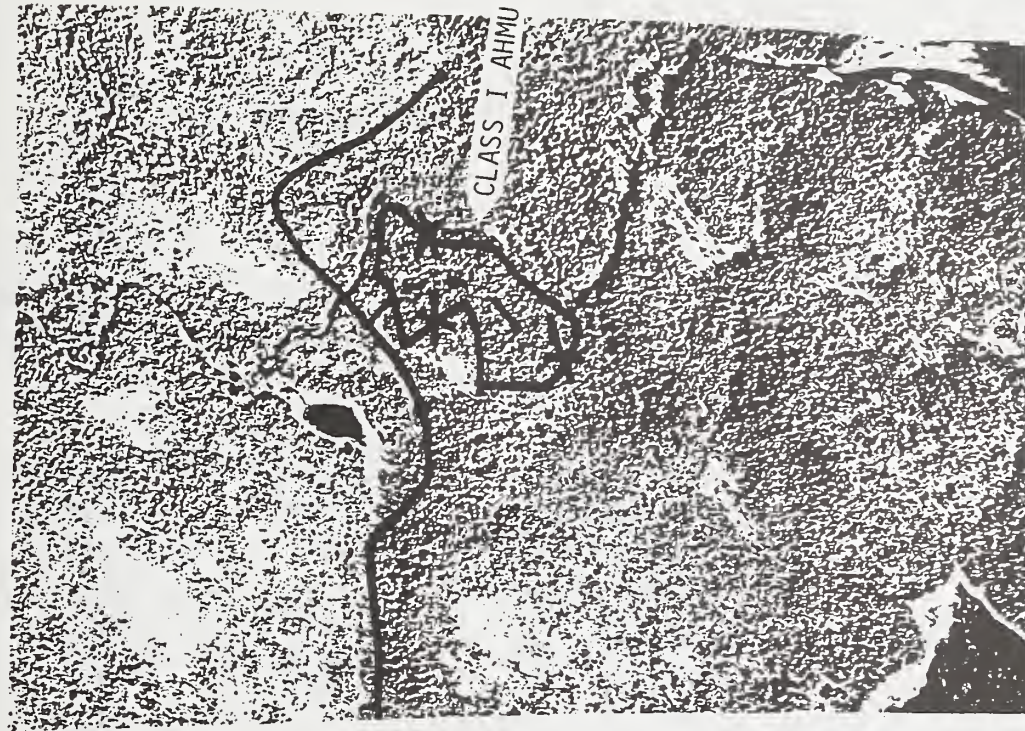
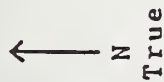
\*For planned unit check box if you want to be notified when unit will be laid out

SA 1900-1  
 (Rev. 3/88)



Layout considerations (windthrow,  
future settlings, etc.)  
C. clauses (Independent Sales)




Date: 8-4-77 Flight Line: 16 Roll: 676 Print # 102



Scale 1" = 1320'

Departures from original plan:

LEGEND

-  CUTTING BOUNDARY
-  SYSTEM ROAD
-  SPUR ROAD

## UNIT LAYOUT CARD

Card Type: I Planned 10/88 by R.H. Burke  
 (Circle) II Laid Out Date IDT Leader/Timber Rep.  
 III Modification Date by  
 Date

Sale Name APC SEIS  
 Unit No. 419-16  
 Acres 14  
 Vol/Acre 40.0 MBF  
 Total Vol 560 MBF  
 Alternative 5

Reviewed By \_\_\_\_\_ Date \_\_\_\_\_

Approved By \_\_\_\_\_ Date \_\_\_\_\_  
 District Ranger

VCU 419 Compartment 13 Stand Number(s) 16

DATE & INITIALS	REMARKS	For Laid Out & Modified Units: Are the impacts of the unit different than those anticipated in the EIS? If yes, explain.
	Cultural	
	<input type="checkbox"/> N	No cultural resource concerns.
*	<input type="checkbox"/> Y	
	Fisheries	
	<input type="checkbox"/> N	Class I AHMU crosses center of unit. 100' buffer on both sides will protect banks and maintain LOD sources. Some high value trees can be removed.
*	<input checked="" type="checkbox"/> Y	
	Lands	
	<input type="checkbox"/> N	No concerns.
*	<input type="checkbox"/> Y	
	Recreation	
	<input type="checkbox"/> N	No anticipated impacts to "recreation places".
*	<input type="checkbox"/> Y	
	Silviculture (should be last to review)	
	<input type="checkbox"/> N	Clearcut with natural regeneration and PCT.
*	<input checked="" type="checkbox"/> Y	
	Soils	
	<input type="checkbox"/> N	No apparent soil management problems.
*	<input type="checkbox"/> Y	
	Visual	
	<input type="checkbox"/> N	Unit will meet assigned VQO of Maximim Modification
*	<input type="checkbox"/> Y	
	Water	
	<input type="checkbox"/> N	Unit borders a low gradient stream on west side. a buffer will protect streambank stability and future sources of LOD.
*	<input type="checkbox"/> Y	
	Wildlife	
	<input type="checkbox"/> N	Unit kept small and spaced to maintain thermal cover for deer. Consider seasonal road closure to protect waterfowl. Survey for eagle nests. Protect nests with 330' buffers and control timing of harvest activities as per eagle mgt guidelines.
*	<input checked="" type="checkbox"/> Y	

\*For planned unit check box if you want to be notified when unit will be laid out

SA 1900-1  
 (Rev. 3/88)

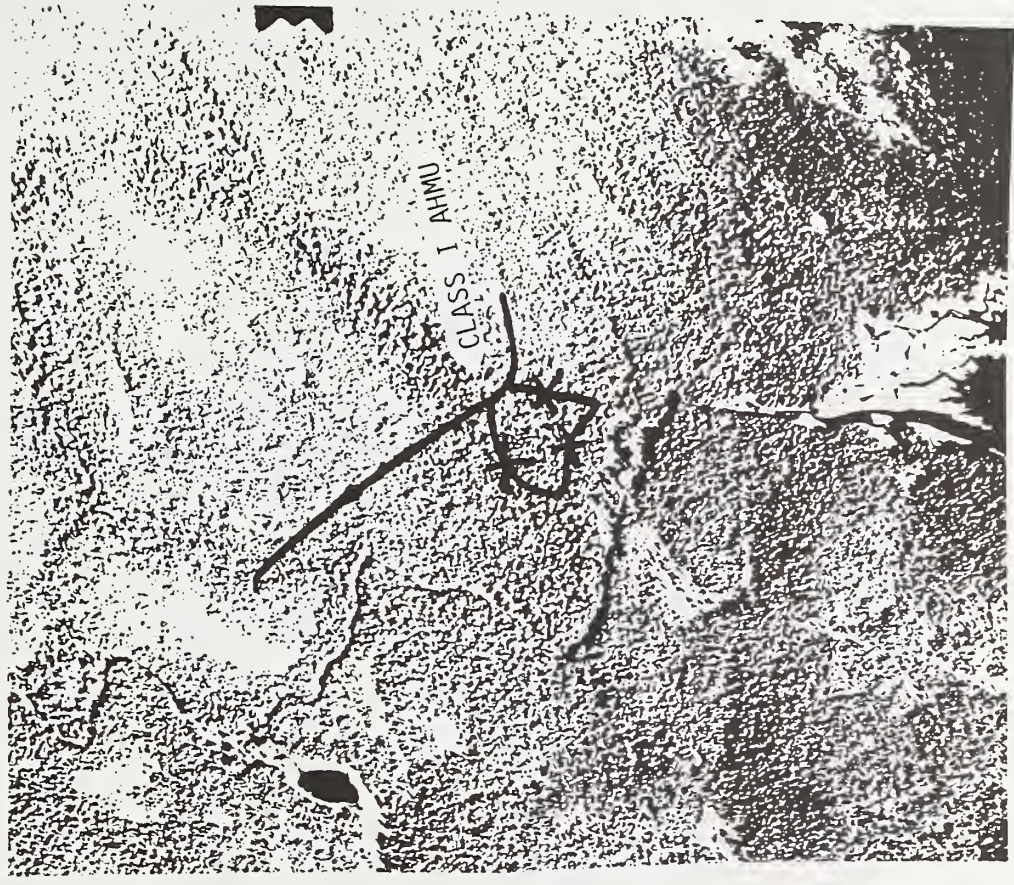
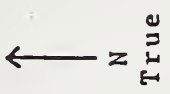


Unit Number 419-16

Layout considerations (windthrow,  
future settings, etc.)  
C. clauses (Independent Sales)

Project Area Map

Date: 8-4-77 Flight Line: 16 Roll: 676 Print # 102



Scale 1" = 1320'

Departures from original plan:

- LEGEND
- CUTTING BOUNDARY
  - SYSTEM ROAD
  - SPUR ROAD



## UNIT LAYOUT CARD

Card Type: I Planned 10/88 by R.H. Burke  
 (Circle) II Laid Out Date IDT Leader/Timber Rep.  
 III Modification Date by  
 Date

Sale Name APC SEIS  
 Unit No. 419-17  
 Acres 21  
 Vol/Acre 24.8 MBF  
 Total Vol 521 MBF  
 Alternative 5

Reviewed By \_\_\_\_\_ Date \_\_\_\_\_

Approved By \_\_\_\_\_ Date \_\_\_\_\_  
 District Ranger

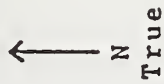
VCU 419 Compartment 13 Stand Number(s) 207

DATE & INITIALS	REMARKS	For Laid Out & Modified Units: Are the impacts of the unit different than those anticipated in the EIS? If yes, explain.
	Cultural	
	<input type="checkbox"/> N	No cultural resource concerns.
*	<input type="checkbox"/> Y	
	Fisheries	
	<input type="checkbox"/> N	No Class I or II AHMUs within or approaching unit. No direct effect on fish habitat.
*	<input type="checkbox"/> Y	
	Lands	
	<input type="checkbox"/> N	No concerns.
*	<input type="checkbox"/> Y	
	Recreation	
	<input type="checkbox"/> N	No anticipated impacts to "recreation places".
*	<input type="checkbox"/> Y	
	Silviculture (should be last to review)	
	<input type="checkbox"/> N	Clearcut with natural regeneration and PCT.
*	<input type="checkbox"/> Y	
X	Soils	
	<input type="checkbox"/> N	Moderately steep slope. Recommend partial suspension over entire unit.
*	<input type="checkbox"/> Y	
	Visual	
	<input type="checkbox"/> N	No visual concerns.
*	<input type="checkbox"/> Y	
	Water	
	<input type="checkbox"/> N	No mapped streams cross or directly border unit. No anticipated water concerns.
*	<input type="checkbox"/> Y	
	Wildlife	
	<input type="checkbox"/> N	Unit kept small and spaced to maintain thermal cover for deer. Consider seasonal road closure to protect waterfowl. Survey for eagle nests. Protect nests with 330' buffers and control timing of harvest activities as per eagle mgt guidelines.
*	<input type="checkbox"/> Y	
X		

\*For planned unit check box if you want to be notified when unit will be laid out




Layout considerations (windthrow,  
future settings, etc.)  
C. clauses (Independent Sales)

Date: 8-4-77 Flight Line: 17 Roll: 776 Print # 39



Departures from original plan:

LEGEND

-  CUTTING BOUNDARY
-  SYSTEM ROAD
-  SPUR ROAD

Scale 1" = 1320'

## UNIT LAYOUT CARD

Card Type: I Planned 10/88 by R.H. Burke  
 (Circle) II Laid Out Date IDT Leader/Timber Rep.  
 III Modification Date by  
 Date

Sale Name APC SEIS  
 Unit No. 419-18  
 Acres 19  
 Vol/Acre 24.8 MBF  
 Total Vol 471 MBF  
 Alternative 5

Reviewed By \_\_\_\_\_ Date \_\_\_\_\_

Approved By \_\_\_\_\_ Date \_\_\_\_\_  
 District Ranger

VCU 419 Compartment 13 Stand Number(s) 207

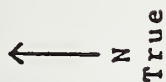
DATE & INITIALS	REMARKS	For Laid Out & Modified Units: Are the impacts of the unit different than those anticipated in the EIS? If yes, explain.
	Cultural	
	<input type="checkbox"/> N	No cultural resource concerns.
*	<input type="checkbox"/> Y	
	Fisheries	
	<input type="checkbox"/> N	Small Class I AHMU enters unit on NW side. A 100' buffer is required to maintain banks and future sources of LOD. Some high value trees may be selectively removed.
*	<input checked="" type="checkbox"/> Y	
	Lands	
	<input type="checkbox"/> N	No concerns.
*	<input type="checkbox"/> Y	
	Recreation	
	<input type="checkbox"/> N	No anticipated impacts to "recreation places".
*	<input type="checkbox"/> Y	
	Silviculture (should be last to review)	
	<input type="checkbox"/> N	Clearcut with natural regeneration and PCT.
*	<input checked="" type="checkbox"/> Y	
	Soils	
	<input type="checkbox"/> N	Moderately steep soils on upper half of unit. Will require about 10 acres of partial suspension.
*	<input type="checkbox"/> Y	
	Visual	
	<input type="checkbox"/> N	No visual concerns. Meets assigned VQO of modification.
*	<input type="checkbox"/> Y	
	Water	
	<input type="checkbox"/> N	Low gradient channel flows through center of unit. A buffer is needed to protect streambank and future sources of LOD.
*	<input checked="" type="checkbox"/> Y	
	Wildlife	
	<input type="checkbox"/> N	Unit kept small and spaced to maintain thermal cover for deer. Consider seasonal road closure to protect waterfowl. Survey for eagle nests. Protect nests with 330' buffers and control timing of harvest activities as per eagle mgt guidelines.
*	<input type="checkbox"/> Y	
	<input checked="" type="checkbox"/> Y	

\*For planned unit check box if you want to be notified when unit will be laid out




SA 1900-1  
 (Rev. 3/88)



Layout considerations (windthrow, future settings, etc.)  
C. clauses (Independent Sales)



Departures from original plan:

- LEGEND
-  CUTTING BOUNDARY
  -  SYSTEM ROAD
  -  SPUR ROAD

Scale 1" = 1320'

## UNIT LAYOUT CARD

Card Type: I Planned 10/88 by R.H. Burke  
 (Circle) Date IDT Leader/Timber Rep.  
 II Laid Out by  
 Date  
 III Modification by  
 Date

Sale Name APC SEIS  
 Unit No. 419-19  
 Acres 25  
 Vol/Acre 24.8 MBF  
 Total Vol 620 MBF  
 Alternative 5

Reviewed By \_\_\_\_\_ Date \_\_\_\_\_

Approved By \_\_\_\_\_ Date \_\_\_\_\_  
 District Ranger

VCU 419 Compartment 13 Stand Number(s) 207

DATE & INITIALS	REMARKS	For Laid Out & Modified Units: Are the impacts of the unit different than those anticipated in the EIS? If yes, explain.
	Cultural	
*	<input type="checkbox"/> N	No cultural resource concerns.
	<input type="checkbox"/> Y	
	Fisheries	
*	<input type="checkbox"/> N	No class I or II AHMUs within or approaching unit. No direct effect on fish habitat.
	<input type="checkbox"/> Y	
	Lands	
*	<input type="checkbox"/> N	No concerns.
	<input type="checkbox"/> Y	
	Recreation	
*	<input type="checkbox"/> N	No anticipated impacts to "recreation places".
	<input type="checkbox"/> Y	
	Silviculture (should be last to review)	
*	<input type="checkbox"/> N	Clearcut with natural regeneration and PCT.
	<input checked="" type="checkbox"/> Y	
	Soils	
*	<input type="checkbox"/> N	No apparent soil management problems.
	<input type="checkbox"/> Y	
	Visual	
*	<input type="checkbox"/> N	Unit will meet assigned VQO of Maximim Modification
	<input type="checkbox"/> Y	
	Water	
*	<input type="checkbox"/> N	Unit borders a low gradient stream on west side. a buffer will protect streambank stability and future sources of LOD.
	<input type="checkbox"/> Y	
	Wildlife	
*	<input type="checkbox"/> N	Unit kept small and spaced to maintain thermal cover for deer. Consider seasonal road closure to protect waterfowl. Survey for eagle nests. Protect nests with 330' buffers and control timing of harvest activities as per eagle mgt guidelines.
	<input checked="" type="checkbox"/> Y	

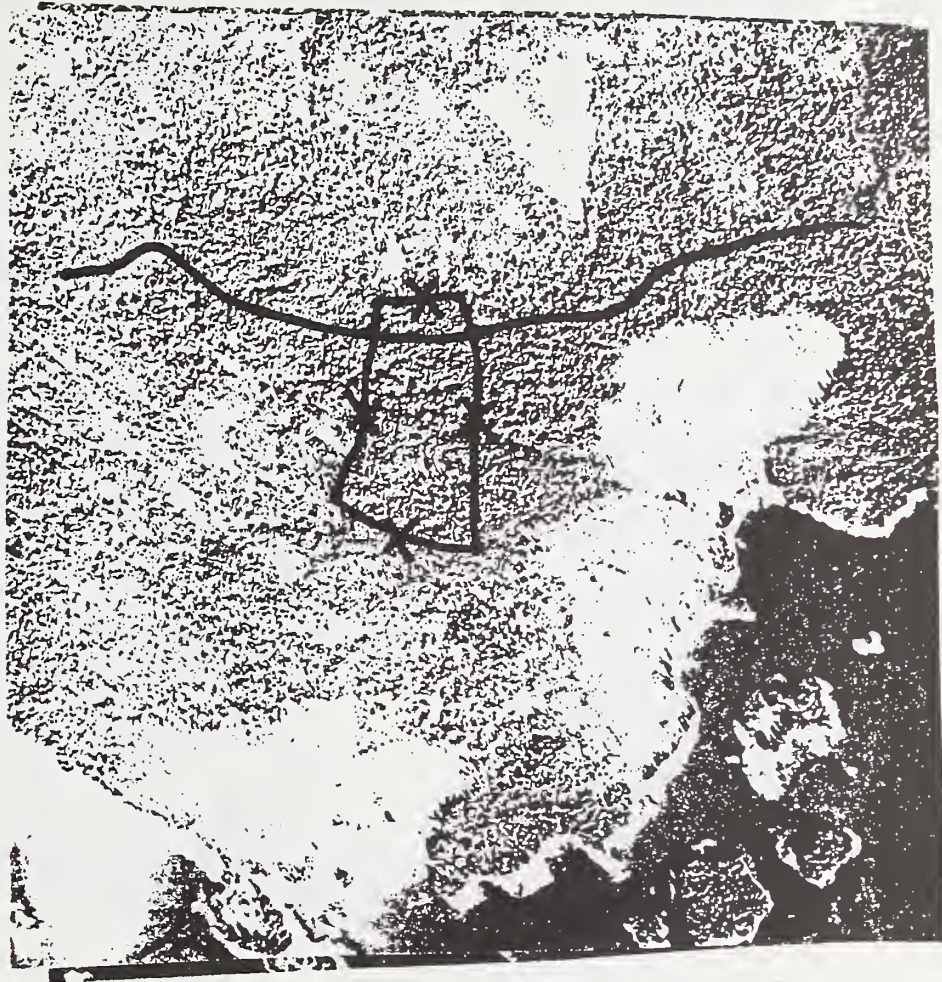
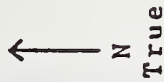
\*For planned unit check box if you want to be notified when unit will be laid out

SA 1900-1  
 (Rev. 3/88)






Layout considerations (windthrow,  
future settings, etc.)  
C. clauses (Independent Sales)

Date: 8-4-77 Flight Line: 17 Roll: 776 Print # 39



Scale 1" = 1320'

Departures from original plan:

- LEGEND
-  CUTTING BOUNDARY
  -  SYSTEM ROAD
  -  SPUR ROAD



## UNIT LAYOUT CARD

Card Type: I Planned 10/88 by R.H. Burke  
 (Circle) II Laid Out Date IDT Leader/Timber Rep.  
 III Modification Date by  
 Date

Sale Name APC SEIS  
 Unit No. 419-20  
 Acres 12  
 Vol/Acre 24.8 MBF  
 Total Vol 298 MBF  
 Alternative 5

Reviewed By \_\_\_\_\_ Date \_\_\_\_\_

Approved By \_\_\_\_\_ Date \_\_\_\_\_  
 District Ranger

VCU 419 Compartment 13 Stand Number(s) 212

DATE & INITIALS	REMARKS	For Laid Out & Modified Units: Are the impacts of the unit different than those anticipated in the EIS? If yes, explain.
	Cultural	
	<input type="checkbox"/> N	No cultural resource concerns.
*	<input type="checkbox"/> Y	
	Fisheries	
	<input type="checkbox"/> N	No class I or II AHMUs in or approaching unit. No direct effect on fish habitat.
*	<input type="checkbox"/> Y	
	Lands	
	<input type="checkbox"/> N	No concerns.
*	<input type="checkbox"/> Y	
	Recreation	
	<input type="checkbox"/> N	No anticipated impacts to "recreation places".
*	<input type="checkbox"/> Y	
	Silviculture (should be last to review)	
	<input type="checkbox"/> N	Clearcut with natural regeneration and PCT.
*	<input type="checkbox"/> Y	
	Soils	
	<input type="checkbox"/> N	No apparent soil management problems.
*	<input type="checkbox"/> Y	
	Visual	
	<input type="checkbox"/> N	No visual concerns for unit as planned.
*	<input type="checkbox"/> Y	
	Water	
	<input type="checkbox"/> N	No mapped streams cross or directly border unit. Nouffer will anticipate water concerns.
*	<input type="checkbox"/> Y	
	Wildlife	
	<input type="checkbox"/> N	Unit kept small and spaced to maintain thermal cover for deer. Consider seasonal road closure to protect waterfowl. Survey for eagle nests. Protect nests with 330' buffers and control timing of harvest activities as per eagle mgt guidelines.
*	<input type="checkbox"/> Y	

\*For planned unit check box if you want to be notified when unit will be laid out

SA 1900-1  
 (Rev. 3/88)

Layout considerations (windthrow,  
future settings, etc.)  
C. clauses (Independent Sales)

Date: 8-4-77 Flight Line: 17 Roll: 776 Print # 40

↑  
N  
True



Scale 1" = 1320'

Departures from original plan:

LEGEND

— X —	CUTTING BOUNDARY
—	SYSTEM ROAD
- - -	SPUR ROAD

## UNIT LAYOUT CARD

Card Type: I Planned 10/88 by R.H. Burke  
 (Circle) II Laid Out Date IDT Leader/Timber Rep.  
 III Modification Date by  
 Date

Sale Name APC SEIS  
 Unit No. 419-21  
 Acres 72  
 Vol/Acre 50.7 MBF  
 Total Vol 3,652 MBF  
 Alternative 5

Reviewed By \_\_\_\_\_ Date \_\_\_\_\_

Approved By \_\_\_\_\_ Date \_\_\_\_\_  
 District Ranger

VCU 419 Compartment 13 Stand Number(s) 35

DATE & INITIALS	REMARKS	For Laid Out & Modified Units: Are the impacts of the unit different than those anticipated in the EIS? If yes, explain.
	Cultural	
	<input type="checkbox"/> N	No cultural resource concerns.
*	<input type="checkbox"/> Y	
	Fisheries	
	<input type="checkbox"/> N	No class I or II AHMUs in or approaching unit. No direct effects on fish habitat.
*	<input type="checkbox"/> Y	
	Lands	
	<input type="checkbox"/> N	No concerns.
*	<input type="checkbox"/> Y	
	Recreation	
	<input type="checkbox"/> N	No anticipated impacts to "recreation places". Harvest will be readily visible to boaters.
*	<input type="checkbox"/> Y	
	Silviculture (should be last to review)	
	<input type="checkbox"/> N	Clearcut with natural regeneration and PCT.
*	<input type="checkbox"/> Y	
	Soils	V-notch drainage needs streambank protection.
	<input type="checkbox"/> N	Recommend using V-notch as split line or suspend logs across.
*	<input type="checkbox"/> Y	
	Visual	
	<input type="checkbox"/> N	Unit will meet assigned VQO of Maximim Modification
*	<input type="checkbox"/> Y	
	Water	
	<input type="checkbox"/> N	High gradient channel flowing to west side of unit will need side slope protection; either split line or full suspension.
*	<input type="checkbox"/> Y	
	Wildlife	Unit kept small and spaced to maintain thermal cover for deer.
	<input type="checkbox"/> N	Consider seasonal road closure to protect waterfowl. Survey for eagle nests. Protect nests with 330' buffers and control timing of harvest activities as per eagle mgt guidelines.
*	<input type="checkbox"/> Y	

\*For planned unit check box if you want to be notified when unit will be laid out

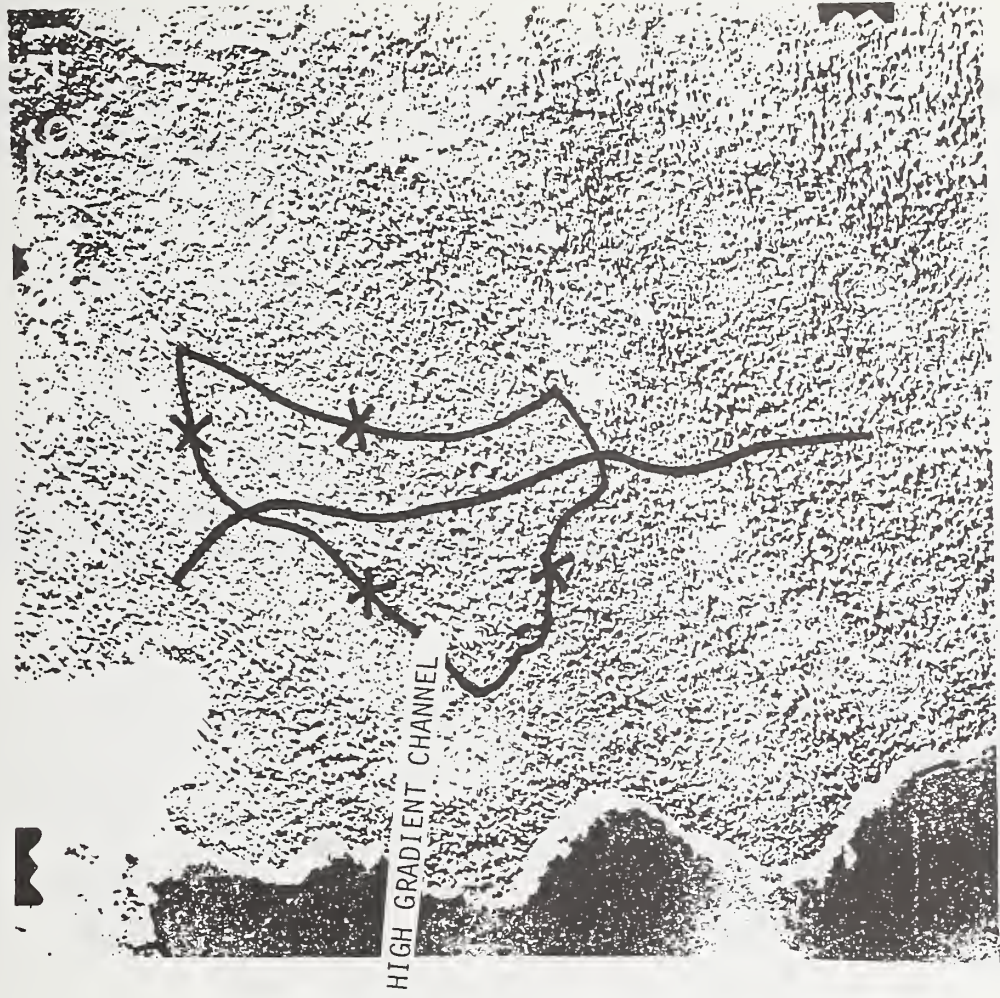
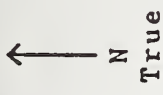
SA 1900-1  
 (Rev. 3/88)



Layout considerations (windthrow, future settings, etc.)  
C. clauses (Independent Sales)

Take upper cutting line to VCU boundary.

Departures from original plan:



- LEGEND
- CUTTING BOUNDARY
  - SYSTEM ROAD
  - SPUR ROAD

## UNIT LAYOUT CARD

Card Type: I Planned 10/88 by R.H. Burke  
 (Circle) Date IDT Leader/Timber Rep.  
 II Laid Out by  
 Date  
 III Modification by  
 Date

Sale Name APC SEIS  
 Unit No. 419-22  
 Acres 56  
 Vol/Acre 40.0 MBF  
 Total Vol 2,240 MBF  
 Alternative 5

Reviewed By \_\_\_\_\_ Date \_\_\_\_\_  
 Approved By \_\_\_\_\_ Date \_\_\_\_\_  
 District Ranger

VCU 419 Compartment 13 Stand Number(s) 210

DATE & INITIALS	REMARKS	For Laid Out & Modified Units: Are the impacts of the unit different than those anticipated in the EIS? If yes, explain.
	Cultural	
*	N	No cultural resource concerns.
	Y	
	Fisheries	
*	N	No Class I or II AHMUs within or approaching unit. No direct effect on fish habitat.
	Y	
	Lands	
*	N	No concerns.
	Y	
	Recreation	
*	N	No anticipated impacts to "recreation places". Harvest unit readily visible to boaters.
	Y	
	Silviculture (should be last to review)	
*	N	Clearcut with natural regeneration and PCT.
X	Y	
	Soils	
*	N	V-notch needs stream-bank protection; eith split line or full suspension.
X	Y	
	Visual	
*	N	No visual concern.
	Y	
	Water	
*	N	Unit has a high gradient channel, V-notch, channel through the center. Split line or full suspension required.
	Y	
	Wildlife	
*	N	Impacts of the unit as planned are not different than those anticipated in the SEIS. No additional mitigation needed.
	Y	

\*For planned unit check box if you want to be notified when unit will be laid out

SA 1900-1  
 (Rev. 3/88)

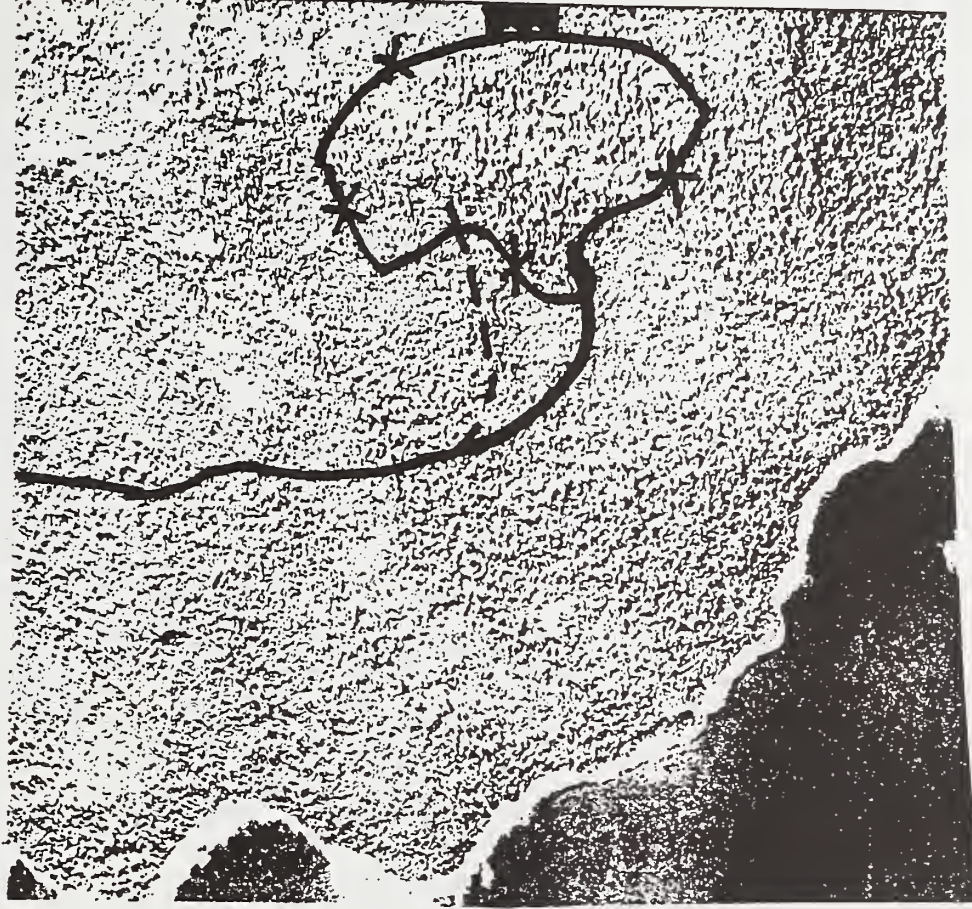
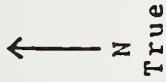


Layout considerations (windthrow,  
future settings, etc.)  
C. clauses (Independent Sales)

Take upper cutting line to VCU boundary.

Departures from original plan:

Date: 8-4-77 Flight Line: 17 Roll: 776 Print # 41



Scale 1" = 1320'

LEGEND

- CUTTING BOUNDARY
- SYSTEM ROAD
- SPUR ROAD



## UNIT LAYOUT CARD

Card Type: I Planned 10/88 by R.H. Burke  
 (Circle) II Laid Out Date IDT Leader/Timber Rep.  
 III Modification Date by

Sale Name APC SEIS  
 Unit No. 420-2  
 Acres 99  
 Vol/Acre 26.2 MBF  
 Total Vol 2,592 MBF  
 Alternative 2,3,4,5

Reviewed By \_\_\_\_\_ Date \_\_\_\_\_

Approved By \_\_\_\_\_ Date \_\_\_\_\_  
 District Ranger

VCU 420 \_\_\_\_\_ Compartment 177 \_\_\_\_\_ Stand Number(s) 166 \_\_\_\_\_

DATE & INITIALS	REMARKS	For Laid Out & Modified Units: Are the impacts of the unit different than those anticipated in the EIS? If yes, explain.
	Cultural	
	<input type="checkbox"/> N	No cultural resource concerns.
*	<input type="checkbox"/> Y	
	Fisheries	
	<input type="checkbox"/> N	No Class I or II AHMUs within or approaching unit. No direct effect on fish habitat.
*	<input type="checkbox"/> Y	
	Lands	
	<input type="checkbox"/> N	No concerns.
*	<input type="checkbox"/> Y	
	Recreation	
	<input type="checkbox"/> N	No anticipated impacts to "recreation places".
*	<input type="checkbox"/> Y	
	Silviculture (should be last to review)	
	<input type="checkbox"/> N	Clearcut with natural regeneration and PCT.
*	<input checked="" type="checkbox"/> Y	
	Soils	
	<input type="checkbox"/> N	No apparent soil management problems.
*	<input type="checkbox"/> Y	
	Visual	
	<input type="checkbox"/> N	Unit rounded on north and south ends to assure meeting assigned VQO of Modification.
*	<input type="checkbox"/> Y	
	Water	
	<input type="checkbox"/> N	Two high gradient channels flow through the unit. Sideslope protection by splitlining required.
*	<input type="checkbox"/> Y	
	Wildlife	
	<input type="checkbox"/> N	Impacts of the unit as planned are not different than those anticipated in the SEIS. No additional mitigation needed.
*	<input type="checkbox"/> Y	

\*For planned unit check box if you want to be notified when unit will be laid out

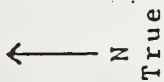
SA 1900-1  
 (Rev. 3/88)

Unit Number 420-2

Layout considerations (windthrow,  
future settings, etc.)  
C. clauses (Independent Sales)

Project Area Map

Date: 8-4-77 Flight Line: 12 Roll: 276 Print # 46



Scale 1" = 1320'

Departures from original plan:

- LEGEND
- CUTTING BOUNDARY
  - SYSTEM ROAD
  - SPUR ROAD



## UNIT LAYOUT CARD

Card Type: I Planned 10/88 by R.H. Burke  
 (Circle) II Laid Out Date IDT Leader/Timber Rep.  
 III Modification Date by

Sale Name APC SEIS  
 Unit No. 420-3  
 Acres 41  
 Vol/Acre 40.0 MBF  
 Total Vol 1,640 MBF  
 Alternative 2,3,4,5

Reviewed By \_\_\_\_\_ Date \_\_\_\_\_

Approved By \_\_\_\_\_ Date \_\_\_\_\_  
 District Ranger

VCU 420 \_\_\_\_\_ Compartment 9 \_\_\_\_\_ Stand Number(s) 173 \_\_\_\_\_

DATE & INITIALS	REMARKS	For Laid Out & Modified Units: Are the impacts of the unit different than those anticipated in the EIS? If yes, explain.
	Cultural	
*	<input type="checkbox"/> N	No cultural resource concerns.
	<input type="checkbox"/> Y	
	Fisheries	
*	<input type="checkbox"/> N	No Class I or II AHMUs within or approaching unit. No direct effect on fish habitat.
	<input type="checkbox"/> Y	
	Lands	
*	<input type="checkbox"/> N	No concerns.
	<input type="checkbox"/> Y	
	Recreation	
*	<input type="checkbox"/> N	No anticipated impacts to "recreation places".
	<input type="checkbox"/> Y	
	Silviculture (should be last to review)	
*	<input type="checkbox"/> N	Clearcut with natural regeneration and PCT.
	<input checked="" type="checkbox"/> Y	
	Soils	
*	<input type="checkbox"/> N	No apparent soil management problems. Good site.
	<input type="checkbox"/> Y	
	Visual	
*	<input type="checkbox"/> N	Unit will meet assigned VQO of modification as designed. assigned VQO of Modification.
	<input type="checkbox"/> Y	
	Water	
*	<input type="checkbox"/> N	One high gradient channel approaches north east corner of unit. Buffer is provided for sideslope protection.
	<input type="checkbox"/> Y	
	Wildlife	
*	<input type="checkbox"/> N	Impacts of the unit as planned are not different than those anticipated in the SEIS. No additional mitigation needed.
	<input type="checkbox"/> Y	

\*For planned unit check box if you want to be notified when unit will be laid out

SA 1900-1  
 (Rev. 3/88)



Unit Number 420-3

Layout considerations (windthrow,  
future settings, etc.)  
C. clauses (Independent Sales)

Project Area Map

Date: 8-4-77 Flight Line: 12 Roll: 276 Print # 47

↑  
N  
True



Scale 1" = 1320'

Departures from original plan:

LEGEND

- X — CUTTING BOUNDARY
- SYSTEM ROAD
- - - SPUR ROAD

105.

## UNIT LAYOUT CARD

Card Type: I Planned 10/88 by R.H. Burke  
 (Circle) Date IDT Leader/Timber Rep.  
 II Laid Out by  
 Date  
 III Modification by  
 Date

Sale Name APC SEIS  
 Unit No. 420-4  
 Acres 109  
 Vol/Acre 37.1 MBF  
 Total Vol 4,044 MBF  
 Alternative 2,3,4,5

Reviewed By \_\_\_\_\_ Date \_\_\_\_\_

Approved By \_\_\_\_\_ Date \_\_\_\_\_  
 District Ranger

VCU 420 Compartment 177 Stand Number(s) 166

DATE & INITIALS	REMARKS	For Laid Out & Modified Units: Are the impacts of the unit different than those anticipated in the EIS? If yes, explain.
	Cultural	
*	<input type="checkbox"/> N	No cultural resource concerns.
	<input type="checkbox"/> Y	
	Fisheries	
*	<input type="checkbox"/> N	No Class I or II AHMUs within or approaching unit. No direct effect on fish habitat.
	<input type="checkbox"/> Y	
	Lands	
*	<input type="checkbox"/> N	No concerns.
	<input type="checkbox"/> Y	
	Recreation	
*	<input type="checkbox"/> N	No anticipated impacts to "recreation places".
	<input type="checkbox"/> Y	
	Silviculture (should be last to review)	
*	<input type="checkbox"/> N	Clearcut with natural regeneration and PCT.
	<input checked="" type="checkbox"/> Y	
	Soils	
*	<input type="checkbox"/> N	V-notch drainage on north west side of unit will need protection. Soil scientist will participate in layout to assure maintenance of streambank stability.
	<input checked="" type="checkbox"/> Y	
	Visual	
*	<input type="checkbox"/> N	Southern portion of backline re-shaped to assure unit will meet assigned VQO of Modification.
	<input type="checkbox"/> Y	
	Water	
*	<input type="checkbox"/> N	Three high gradient channels (A1) flow through unit. (Two in center, one on northern edge.) Sideslope protection by split lining required.
	<input type="checkbox"/> Y	
	Wildlife	
*	<input type="checkbox"/> N	Impacts of the unit as planned are not different than those anticipated in the SEIS. No additional mitigation needed.
	<input type="checkbox"/> Y	

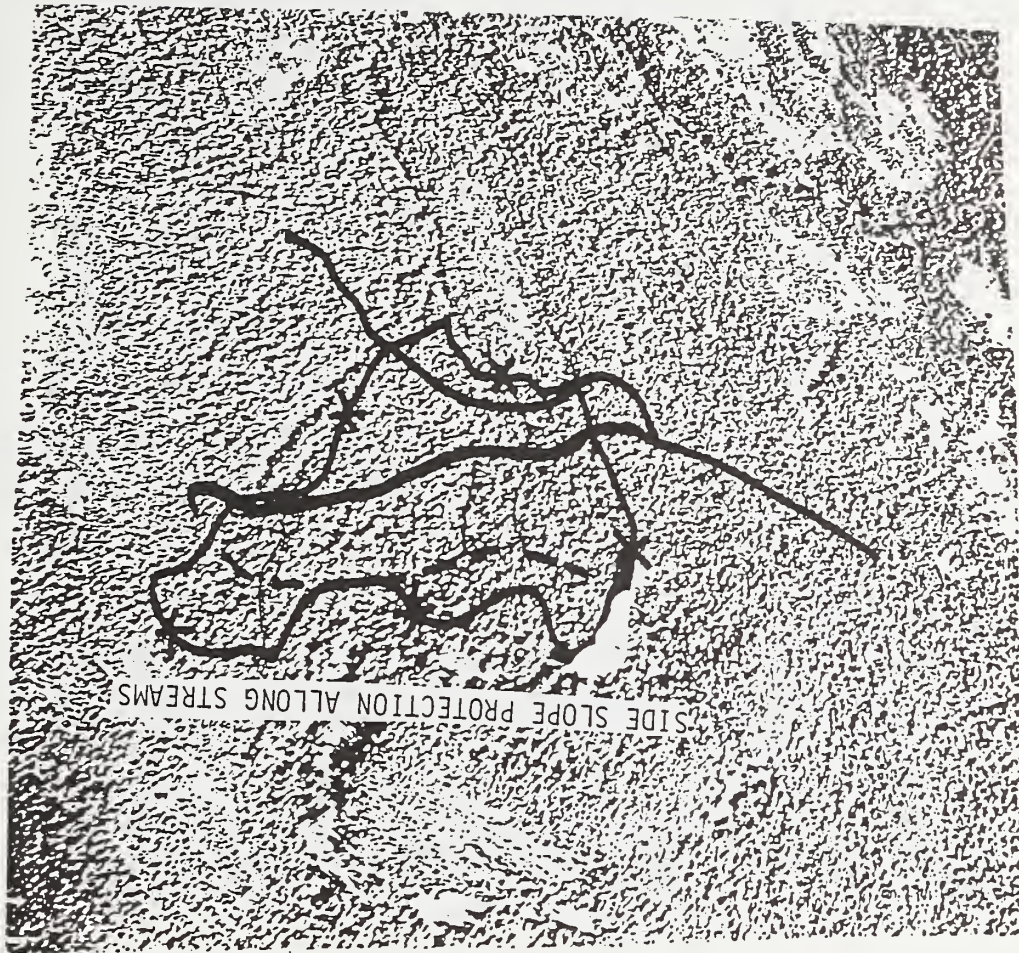
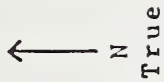
\*For planned unit check box if you want to be notified when unit will be laid out

SA 1900-1  
 (Rev. 3/88)






Layout considerations (windthrow, future settings, etc.)  
C. clauses (Independent Sales)  
Do not isolate timber.

Departures from original plan:



Scale 1" = 1320'

LEGEND

-  CUTTING BOUNDARY
-  SYSTEM ROAD
-  SPUR ROAD



## UNIT LAYOUT CARD

Card Type: I Planned 10/88 by R.H. Burke  
 (Circle) II Laid Out Date IDT Leader/Timber Rep.  
 III Modification Date by  
 Date

Sale Name APC SEIS  
 Unit No. 420-6  
 Acres 72  
 Vol/Acre 40.0 MBF  
 Total Vol 2,880 MBF  
 Alternative 2,3,4,5

Reviewed By \_\_\_\_\_ Date \_\_\_\_\_

Approved By \_\_\_\_\_ Date \_\_\_\_\_  
 District Ranger

VCU 420 \_\_\_\_\_ Compartment 9 \_\_\_\_\_ Stand Number(s) 173 \_\_\_\_\_

DATE & INITIALS	REMARKS	For Laid Out & Modified Units: Are the impacts of the unit different than those anticipated in the EIS? If yes, explain.
	Cultural	
*	<input type="checkbox"/> N	No cultural resource concerns.
	<input type="checkbox"/> Y	
	Fisheries	
*	<input type="checkbox"/> N	South corner of unit borders a Class I AHMU. Stream banks will be protected by applying Class I AHMU prescriptions within 100' of stream.
	<input checked="" type="checkbox"/> Y	
	Lands	
*	<input type="checkbox"/> N	No concerns.
	<input type="checkbox"/> Y	
	Recreation	
*	<input type="checkbox"/> N	No anticipated impacts to "recreation places".
	<input type="checkbox"/> Y	
	Silviculture (should be last to review)	
*	<input type="checkbox"/> N	Clearcut with natural regeneration and PCT.
	<input checked="" type="checkbox"/> Y	
	Soils	
*	<input type="checkbox"/> N	No apparent soil management problems.
	<input type="checkbox"/> Y	
	Visual	
*	<input type="checkbox"/> N	Unit will meet Maximum Modification assigned VQO. No visual resource concerns.
	<input type="checkbox"/> Y	
	Water	
*	<input type="checkbox"/> N	High gradient channels flow through the center and southwestern corner of unit. Splitline needed for sideslope protection. Southwest corner borders a small floodplain channel. 100' buffer needed to minimize channel instability.
	<input type="checkbox"/> Y	
	Wildlife	
*	<input type="checkbox"/> N	100' wind firm buffer along Crane Creek will protect important riparian habitat.
	<input type="checkbox"/> Y	

\*For planned unit check box if you want to be notified when unit will be laid out

SA 1900-1  
 (Rev. 3/88)

Layout considerations (windthrow,  
future settings, etc.)  
C. clauses (Independent Sales)




Date: 8-4-77 Flight Line: 12 Roll: 276 Print # 47

↑  
N  
True



Departures from original plan:

LEGEND

-  CUTTING BOUNDARY  
 SYSTEM ROAD  
 SPUR ROAD

109.

Scale 1" = 1320'

## UNIT LAYOUT CARD

Card Type: I Planned 10/88 by R.H. Burke  
 (Circle) II Laid Out Date IDT Leader/Timber Rep.  
 III Modification Date by  
 Date

Sale Name APC SEIS  
 Unit No. 420-7  
 Acres 58  
 Vol/Acre 40.0 MBF  
 Total Vol 2,320 MBF  
 Alternative 2,3,4,5

Reviewed By \_\_\_\_\_ Date \_\_\_\_\_

Approved By \_\_\_\_\_ Date \_\_\_\_\_  
 District Ranger

VCU 420 \_\_\_\_\_ Compartment 14 \_\_\_\_\_ Stand Number(s) 298 \_\_\_\_\_

DATE & INITIALS	REMARKS	For Laid Out & Modified Units: Are the impacts of the unit different than those anticipated in the EIS? If yes, explain.
	Cultural	
*	N	Unit is located in medium probability zone for cultural resources. A reconnaissance level field inventory had been conducted and failed to discover any cultural resources.
	Y	
	Fisheries	
*	N	No Class I or II AHMUs within or approaching unit. No direct effect on fish habitat.
	Y	
	Lands	
*	N	No concerns.
	Y	
	Recreation	
*	N	No anticipated impacts to "recreation places".
	Y	
	Silviculture (should be last to review)	
*	N	Clearcut with natural regeneration and PCT.
X	Y	
	Soils	
*	N	No apparent soil management problems.
	Y	
	Visual	
*	N	Backline kept low on slope to meet assigned VQO of Modification
	Y	
	Water	
*	N	Two high gradient channels flow through the unit. Sideslope protection by splitlining required.
	Y	
	Wildlife	
*	N	Impacts of the unit as planned are not different than those anticipated in the SEIS. No additional mitigation needed.
	Y	

\*For planned unit check box if you want to be notified when unit will be laid out

SA 1900-1  
 (Rev. 3/88)

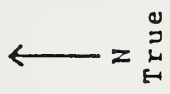


Unit Number 420-7

Project Area Map

Layout considerations (windthrow,  
future settings, etc.)  
C. clauses (Independent Sales)

Date: 8-4-77 Flight Line: 12 Roll: 276 Print # 47



Scale 1" = 1320'

Departures from original plan:

- LEGEND
- CUTTING BOUNDARY
  - SYSTEM ROAD
  - SPUR ROAD

## UNIT LAYOUT CARD

Card Type: I Planned 10/88 by R.H. Burke  
 (Circle) Date IDT Leader/Timber Rep.  
 II Laid Out by  
 Date  
 III Modification by  
 Date

Sale Name APC SEIS  
 Unit No. 420-8  
 Acres 71  
 Vol/Acre 40.0 MBF  
 Total Vol 2,840 MBF  
 Alternative 2,3,4,5

Reviewed By \_\_\_\_\_ Date \_\_\_\_\_

Approved By \_\_\_\_\_ Date \_\_\_\_\_  
 District Ranger

VCU 420 Compartment 14 Stand Number(s) 300

DATE & INITIALS	REMARKS	For Laid Out & Modified Units: Are the impacts of the unit different than those anticipated in the EIS? If yes, explain.
	Cultural	
	<input type="checkbox"/> N	No cultural resource concerns.
*	<input type="checkbox"/> Y	
	Fisheries	
	<input type="checkbox"/> N	North side of unit separated from Class I AHMU by 100' buffer. Design buffer to be wind firm.
*	<input type="checkbox"/> Y	
	Lands	
	<input type="checkbox"/> N	No concerns.
*	<input type="checkbox"/> Y	
	Recreation	
	<input type="checkbox"/> N	No anticipated impacts to "recreation places".
*	<input type="checkbox"/> Y	
	Silviculture (should be last to review)	
	<input type="checkbox"/> N	Clearcut with natural regeneration and PCT.
*	<input type="checkbox"/> Y	
X	Soils	
	<input type="checkbox"/> N	V-notched stream should be used as a split line to protect stream bank stability. Keep backline as high on slope as possible; directly below bedrock bench.
*	<input type="checkbox"/> Y	
X	Visual	
	<input type="checkbox"/> N	No visual concerns; will meet assigned VQO of Modification.
*	<input type="checkbox"/> Y	
	Water	
	<input type="checkbox"/> N	High gradient stream channel flowing south-north through center of unit. Split line on channel will provide sideslope stability. Stream on north border has buffer for stream bank protection.
*	<input type="checkbox"/> Y	
	Wildlife	
	<input type="checkbox"/> N	Impacts of the unit as planned are not different than those anticipated in the SEIS. No additional mitigation needed.
*	<input type="checkbox"/> Y	

\*For planned unit check box if you want to be notified when unit will be laid out

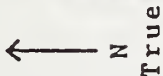
SA 1900-1  
 (Rev. 3/88)



Layout considerations (windthrow,  
future settings, etc.)  
C. clauses (Independent Sales)




Date: 8-4-77 Flight Line: 12 Roll: 276 Print # 47

Departures from original plan:



Scale 1" = 1320'

LEGEND

-  CUTTING BOUNDARY
-  SYSTEM ROAD
-  SPUR ROAD



## UNIT LAYOUT CARD

Card Type: I Planned 10/88 by R.H. Burke  
 (Circle) II Laid Out Date IDT Leader/Timber Rep.  
 III Modification Date by  
 Date

Sale Name APC SEIS  
 Unit No. 420-10  
 Acres 55  
 Vol/Acre 22.3 MBF  
 Total Vol 1,227 MBF  
 Alternative 2,3,4,5

Reviewed By \_\_\_\_\_ Date \_\_\_\_\_

Approved By \_\_\_\_\_ Date \_\_\_\_\_  
 District Ranger

VCU 420 Compartment 147 Stand Number(s) 291

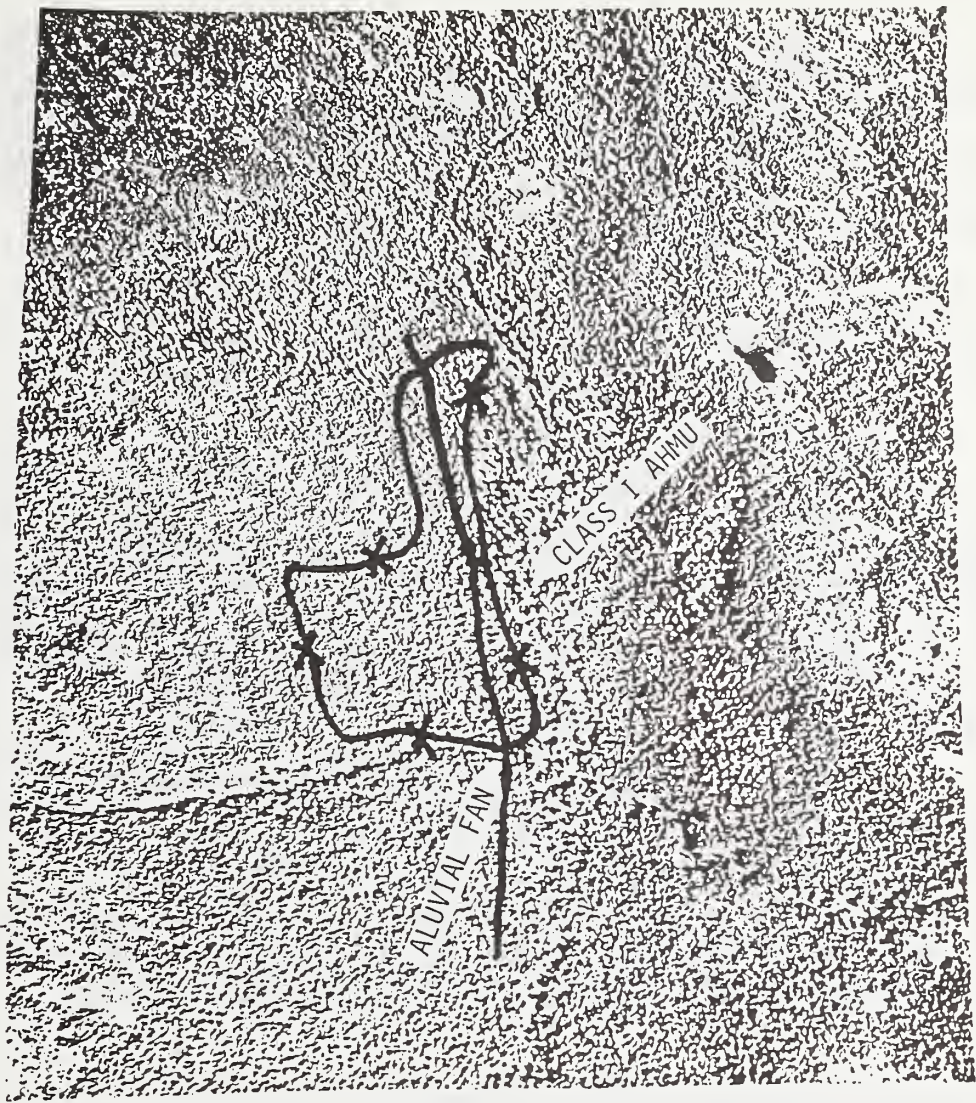
DATE & INITIALS	REMARKS	For Laid Out & Modified Units: Are the impacts of the unit different than those anticipated in the EIS? If yes, explain.
	Cultural	
*	<input type="checkbox"/> N	No cultural resource concerns.
	<input type="checkbox"/> Y	
	Fisheries	
*	<input type="checkbox"/> N	South side of unit separated from Class I AHMU by 100' buffer. Wind firm design will protect banks and provide future source of LOD. No direct effect on fish habitat.
	<input checked="" type="checkbox"/> Y	
	Lands	
*	<input type="checkbox"/> N	No concerns.
	<input type="checkbox"/> Y	
	Recreation	
*	<input type="checkbox"/> N	No anticipated impacts to "recreation places".
	<input type="checkbox"/> Y	
	Silviculture (should be last to review)	
*	<input type="checkbox"/> N	Clearcut with natural regeneration and PCT.
	<input checked="" type="checkbox"/> Y	
	Soils	
*	<input type="checkbox"/> N	No apparent soil management problems.
	<input type="checkbox"/> Y	
	Visual	
*	<input type="checkbox"/> N	Backline will be visible from Port Camden. Consult LA during layout to insure unit meets assigned VQO.
	<input checked="" type="checkbox"/> Y	
	Water	
*	<input type="checkbox"/> N	High gradient alluvial fan channel in eastern end of unit. A buffer will be required to minimize channel instability.
	<input type="checkbox"/> Y	
	Wildlife	
*	<input type="checkbox"/> N	Maintain and improve deer winter range by precommercial thinning to 20'x20'. Protect riparian habitat by maintaining a 100' wind firm buffer along stream on south edge of unit.
	<input type="checkbox"/> Y	

\*For planned unit check box if you want to be notified when unit will be laid out

SA 1900-1  
 (Rev. 3/88)

Layout considerations (windthrow, future settings, etc.)  
C. clauses (Independent Sales)

Departures from original plan:



Scale 1" = 1320'

LEGEND

- X — CUTTING BOUNDARY
- SYSTEM ROAD
- - - SPUR ROAD

115



## UNIT LAYOUT CARD

Card Type: I Planned 10/88 by R.H. Burke  
 (Circle) Date IDT Leader/Timber Rep.  
 II Laid Out by  
 Date  
 III Modification by  
 Date

Sale Name APC SEIS  
 Unit No. 420-11  
 Acres 41  
 Vol/Acre 40.0 MBF  
 Total Vol 1,640 MBF  
 Alternative 2,3,4,5

Reviewed By \_\_\_\_\_ Date \_\_\_\_\_

Approved By \_\_\_\_\_ Date \_\_\_\_\_  
 District Ranger

VCU 420 Compartment 14 Stand Number(s) 289

DATE & INITIALS	REMARKS	For Laid Out & Modified Units: Are the impacts of the unit different than those anticipated in the EIS? If yes, explain.
	Cultural	
*	N	This unit is within the medium to low probability zone for cultural resources. A reconnaissance level field inventory failed to discover any cultural resources.
	Y	
	Fisheries	
*	N	South side of unit seperated from Class I AHMU by buffer.rect A wind firm buffer will prevent direct effects on fish habitat.
X	Y	
	Lands	
*	N	No concerns.
	Y	
	Recreation	
*	N	No anticipated impacts to "recreation places".
	Y	
	Silviculture (should be last to review)	
*	N	Clearcut with natural regeneration and PCT.
X	Y	
	Soils	
*	N	Moderately sloping wet site. No anticipated woil problems.
	Y	
	Visual	
*	N	May be partially visible from Port Camden. Will meet assigned VQO of Maxium Modification.
	Y	
	Water	
*	N	No mapped streams in unit. No concerns given planned buffer.
	Y	
	Wildlife	
*	N	Maintain or improve winter deer range by thinning to a 20'x20' spacing. Protect riparian by maintaining wind firm buffer along stream on south side of unit.
	Y	

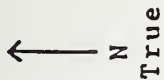
\*For planned unit check box if you want to be notified when unit will be laid out

SA 1900-1  
 (Rev. 3/88)



Layout considerations (windthrow, future settings, etc.)  
C. clauses (Independent Sales)

Departures from original plan:



Scale 1" = 1320'

LEGEND

- CUTTING BOUNDARY
- SYSTEM ROAD
- SPUR ROAD

## UNIT LAYOUT CARD

Card Type: I Planned 10/88 by R.H. Burke  
 (Circle) II Laid Out Date IDT Leader/Timber Rep.  
 III Modification Date by  
 Date

Sale Name APC SEIS  
 Unit No. 420-12  
 Acres 54  
 Vol/Acre 40.0 MBF  
 Total Vol 2,160 MBF  
 Alternative 2,3,4,5

Reviewed By \_\_\_\_\_ Date \_\_\_\_\_

Approved By \_\_\_\_\_ Date \_\_\_\_\_  
 District Ranger

VCU 420 \_\_\_\_\_ Compartment 14 \_\_\_\_\_ Stand Number(s) 287 \_\_\_\_\_

DATE & INITIALS	REMARKS	For Laid Out & Modified Units: Are the impacts of the unit different than those anticipated in the EIS? If yes, explain.
	Cultural	
	<input type="checkbox"/> N	No cultural resource concerns.
*	<input type="checkbox"/> Y	
	Fisheries	
	<input type="checkbox"/> N	North east part of unit seperated from Class I AHMU by a 100' buffer. A wind-firm buffer will prevent direct effects on fish habitat.
*	<input checked="" type="checkbox"/> Y	
	Lands	
	<input type="checkbox"/> N	No concerns.
*	<input type="checkbox"/> Y	
	Recreation	
	<input type="checkbox"/> N	No anticipated impacts to "recreation places".
*	<input type="checkbox"/> Y	
	Silviculture (should be last to review)	
	<input type="checkbox"/> N	Clearcut with natural regeneration and PCT.
*	<input checked="" type="checkbox"/> Y	
	Soils	
	<input type="checkbox"/> N	Need to insure that buffer on east side is wind firm.
*	<input checked="" type="checkbox"/> Y	
	Visual	
	<input type="checkbox"/> N	No visual concerns. Unit will meet assigned VQO if Maximum Modificaton.
*	<input type="checkbox"/> Y	
	Water	
	<input type="checkbox"/> N	Unit borders two short stream segments on eastern end. A wind firm buffer will be needed for northern segment, sideslope protection for eastern segment.
*	<input type="checkbox"/> Y	
	Wildlife	
	<input type="checkbox"/> N	Improve forage production by precommercial thinning to a 20'x20 spacing. Protect riparian habitat by maintaining a 100' wind-firm buffer along stream on north edge of unit.
*	<input type="checkbox"/> Y	

\*For planned unit check box if you want to be notified when unit will be laid out

SA 1900-1  
 (Rev. 3/88)



Layout considerations (windthrow, future settings, etc.)  
C. clauses (Independent Sales)

Take all merchantable timber except for raparian area.

Date: 8-4-77 Flight Line: 12 Roll: 276 Print # 50

↑ N True



Departures from original plan:

Scale 1" = 1320'

LEGEND

- X--- CUTTING BOUNDARY
- ===== SYSTEM ROAD
- - - - - SPUR ROAD



## UNIT LAYOUT CARD

Card Type: I Planned 10/88 by R.H. Burke  
 (Circle) II Laid Out Date IDT Leader/Timber Rep.  
 III Modification Date by

Sale Name APC SEIS  
 Unit No. 420-13  
 Acres 108  
 Vol/Acre 40.0 MBF  
 Total Vol 4,320 MBF  
 Alternative 2,3,4,5

Reviewed By \_\_\_\_\_ Date \_\_\_\_\_

Approved By \_\_\_\_\_ Date \_\_\_\_\_  
 District Ranger

VCU 420 Compartment 14 Stand Number(s) 287

DATE & INITIALS	REMARKS	For Laid Out & Modified Units: Are the impacts of the unit different than those anticipated in the EIS? If yes, explain.
	Cultural	
*	<input type="checkbox"/> N	No cultural resource concerns.
	<input type="checkbox"/> Y	
	Fisheries	
*	<input type="checkbox"/> N	North side of unit separated from Class I AHMU by a 100' buffer
	<input checked="" type="checkbox"/> Y	Wind firm buffer will eliminate any direct effects on fish habitat.
	Lands	
*	<input type="checkbox"/> N	No concerns.
	<input type="checkbox"/> Y	
	Recreation	
*	<input type="checkbox"/> N	No anticipated impacts to "recreation places".
	<input type="checkbox"/> Y	
	Silviculture (should be last to review)	
*	<input type="checkbox"/> N	Clearcut with natural regeneration and PCT.
	<input checked="" type="checkbox"/> Y	
	Soils	
*	<input type="checkbox"/> N	No apparent soil management problems.
	<input type="checkbox"/> Y	
	Visual	
*	<input type="checkbox"/> N	Unit meets assigned VQO of Maximum Modification as planned.
	<input type="checkbox"/> Y	
	Water	
*	<input type="checkbox"/> N	One short segment of high gradient channel in souther tip of unit. Provide side slope protection by partial suspension across channel.
	<input type="checkbox"/> Y	
	Wildlife	
*	<input type="checkbox"/> N	Improve forage production in second growth winter deer range by thinning to a 20'x20' spacing. AHMU buffer will protect riparian habitat along stream just north of unit.
	<input type="checkbox"/> Y	

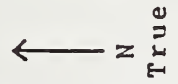
\*For planned unit check box if you want to be notified when unit will be laid out

SA 1900-1  
 (Rev. 3/88)

Layout considerations (windthrow, future settings, etc.)  
C. clauses (Independent Sales)

Take all timber except for the small leave strip between units 13 and 14, and the raparian area in order to keep from isolating timber and to avoid rebuilding the bridge.

Departures from original plan:



Scale 1" = 1320'

LEGEND

- CUTTING BOUNDARY
- SYSTEM ROAD
- SPUR ROAD



## UNIT LAYOUT CARD

Card Type: I Planned 10/88 by R.H. Burke  
 (Circle) II Laid Out Date IDT Leader/Timber Rep.  
 III Modification Date by  
 Date

Sale Name APC SEIS  
 Unit No. 420-14  
 Acres 15  
 Vol/Acre 24.8 MBF  
 Total Vol 372 MBF  
 Alternative 2,3,4,5

Reviewed By \_\_\_\_\_ Date \_\_\_\_\_

Approved By \_\_\_\_\_ Date \_\_\_\_\_  
 District Ranger

VCU 420 \_\_\_\_\_ Compartment 14 \_\_\_\_\_ Stand Number(s) 200 \_\_\_\_\_

DATE & INITIALS	REMARKS	For Laid Out & Modified Units: Are the impacts of the unit different than those anticipated in the EIS? If yes, explain.
	Cultural	
	<input type="checkbox"/> N	Unit is located within a high and medium probability zone for cultural resources. A reconnaissance level field inventory failed to discover any cultural resources within the unit.
*	<input type="checkbox"/> Y	
	Fisheries	
	<input type="checkbox"/> N	North side of unit separated from a Class I AHMU by a 100' buffer. A wind-firm buffer will prevent any direct impacts on fish habitat.
*	<input checked="" type="checkbox"/> Y	
	Lands	
	<input type="checkbox"/> N	No concerns.
*	<input type="checkbox"/> Y	
	Recreation	
	<input type="checkbox"/> N	No anticipated impacts to "recreation places".
*	<input type="checkbox"/> Y	
	Silviculture (should be last to review)	
	<input type="checkbox"/> N	Clearcut with natural regeneration and PCT.
*	<input type="checkbox"/> Y	
	Soils	
	<input type="checkbox"/> N	No apparent soil management problems.
*	<input type="checkbox"/> Y	
	Visual	
	<input type="checkbox"/> N	Unit kept small to meet Partial Retention and Modification VQO.
*	<input type="checkbox"/> Y	
	Water	
	<input type="checkbox"/> N	No mapped stream within or approaching unit. No anticipated water concerns given planned buffer.
*	<input type="checkbox"/> Y	
	Wildlife	
	<input type="checkbox"/> N	Keep road back from beach fringe. Wind firm AHMU buffer will protect riparian habitat.
*	<input type="checkbox"/> Y	

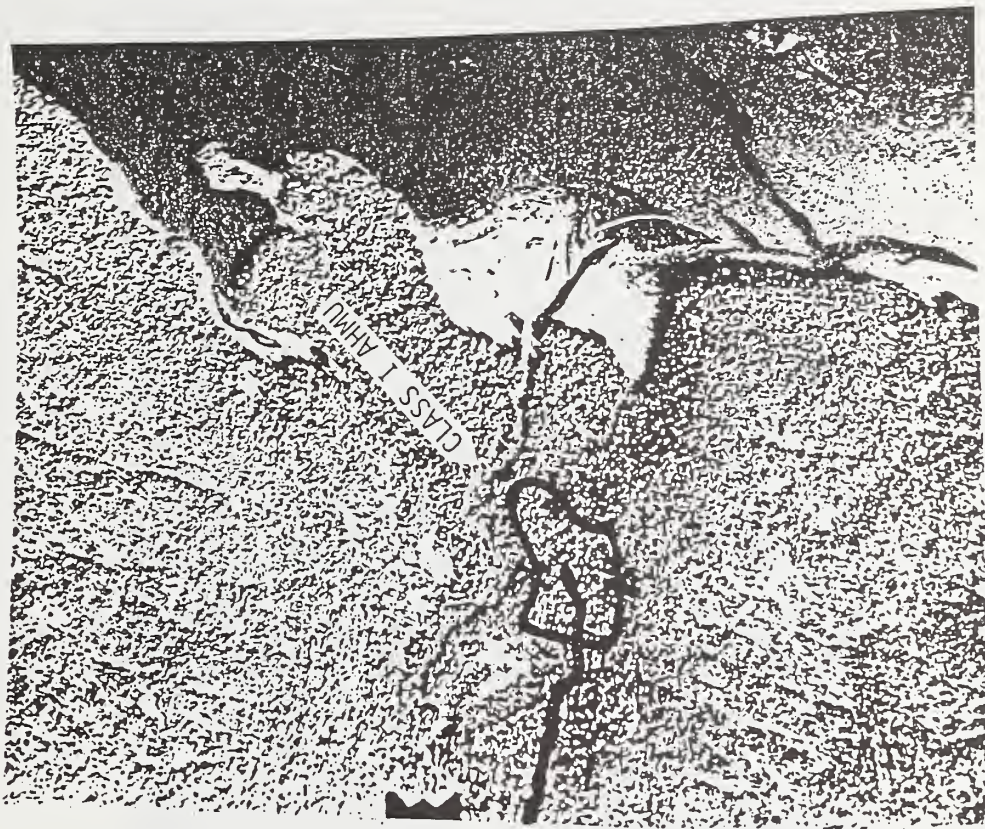
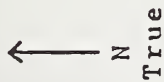
\*For planned unit check box if you want to be notified when unit will be laid out

SA 1900-1  
 (Rev. 3/88)



LAYOUT CONSIDERATIONS (WINDTHROW,  
FUTURE SETTINGS, ETC.)  
C. CLAUSES (INDEPENDENT SALES)

DATE: 8-4-77 FLIGHT LINE: 13 ROLL: 676 PRINT # 47



Scale 1" = 1320'

Departures from original plan:

- LEGEND
- CUTTING BOUNDARY
  - SYSTEM ROAD
  - SPUR ROAD

## UNIT LAYOUT CARD

Card Type: I Planned 10/88 by R.H. Burke  
 (Circle) Date IDT Leader/Timber Rep.  
 II Laid Out by  
 Date  
 III Modification by  
 Date

Sale Name APC SEIS  
 Unit No. 421-6  
 Acres 116  
 Vol/Acre 40.0 MBF  
 Total Vol 4,640 MBF  
 Alternative 3,4,5

Reviewed By \_\_\_\_\_ Date \_\_\_\_\_

Approved By \_\_\_\_\_ Date \_\_\_\_\_  
 District Ranger

VCU 400 \_\_\_\_\_ Compartment 8 \_\_\_\_\_ Stand Number(s) 118 \_\_\_\_\_

DATE & INITIALS	REMARKS	For Laid Out & Modified Units: Are the impacts of the unit different than those anticipated in the EIS? If yes, explain.
	Cultural	
*	<input type="checkbox"/> N	Unit is within the moderate probability zone for cultural resources. Cultural survey required prior to harvest and road construction. This will provide effective protection.
	<input type="checkbox"/> Y	
	Fisheries	
*	<input type="checkbox"/> N	Planned unit has Class I AHMU bordering SW and north center. These are low gradient lake-like channels. LOD is not very important. Channel banks and flood plains should be protected
X	<input type="checkbox"/> Y	Leaning trees should be left to fall into stream.
	Lands	
*	<input type="checkbox"/> N	No concerns.
	<input type="checkbox"/> Y	
	Recreation	
*	<input type="checkbox"/> N	Trail to Kadake Creek is a KV opportunity.
	<input type="checkbox"/> Y	
	Silviculture (should be last to review)	
*	<input type="checkbox"/> N	Clearcut with natural regeneration and PCT.
X	<input type="checkbox"/> Y	
	Soils	
*	<input type="checkbox"/> N	No apparent soil management problems.
	<input type="checkbox"/> Y	
	Visual	
*	<input type="checkbox"/> N	Unit will be visible from Kadake Creek and will not meet assigned VQO as discussed in SEIS. No degree of mitigation will reduce impact.
	<input type="checkbox"/> Y	
	Water	
*	<input type="checkbox"/> N	No mapped streams cross or directly border the unit. No anticipated water concerns.
	<input type="checkbox"/> Y	
	Wildlife	
*	<input type="checkbox"/> N	Impacts of the unit as planned are not different than those anticipated in the SEIS. No additional mitigation needed.
	<input type="checkbox"/> Y	

\*For planned unit check box if you want to be notified when unit will be laid out

SA 1900-1  
 (Rev. 3/88)



Layout considerations (windthrow, future settings, etc.)  
C. clauses (Independent Sales)

Take intire stand. Do not isolate timber.

Date: 8-4-77 Flight Line: 12 Roll: 276 Print # 43

↑ N  
True



Departures from original plan:

- LEGEND
- ✕---✕ CUTTING BOUNDARY
  - SYSTEM ROAD
  - SPUR ROAD

Scale 1" = 1320'



## UNIT LAYOUT CARD

Card Type: I Planned 10/88 by R.H. Burke  
 (Circle) Date IDT Leader/Timber Rep.  
 II Laid Out by  
 Date  
 III Modification by  
 Date

Sale Name APC SEIS  
 Unit No. 421-7  
 Acres 87  
 Vol/Acre 40.0 MBF  
 Total Vol 3,480 MBF  
 Alternative 3,4,5

Reviewed By \_\_\_\_\_ Date \_\_\_\_\_

Approved By \_\_\_\_\_ Date \_\_\_\_\_  
 District Ranger

VCU 421 \_\_\_\_\_ Compartment 8 \_\_\_\_\_ Stand Number(s) 120 \_\_\_\_\_

DATE & INITIALS	REMARKS	For Laid Out & Modified Units: Are the impacts of the unit different than those anticipated in the EIS? If yes, explain.
	Cultural	
	<input type="checkbox"/> N	No cultural resource concerns.
*	<input type="checkbox"/> Y	
	Fisheries	
	<input type="checkbox"/> N	No Class I or II AHMUs within or approaching unit. No direct effect on fish habitat.
*	<input type="checkbox"/> Y	
	Lands	
	<input type="checkbox"/> N	No concerns.
*	<input type="checkbox"/> Y	
	Recreation	
	<input type="checkbox"/> N	Keep unit boundary back as far as practical from Kadake Creek to minimize impact on recreation users.
*	<input type="checkbox"/> Y	
	Silviculture (should be last to review)	
	<input type="checkbox"/> N	Clearcut with natural regeneration and PCT.
*	<input type="checkbox"/> Y	
	Soils	
	<input type="checkbox"/> N	Very shallow, steep soils and rock cliff on upper part of unit. Unit was field checked in Sept of 1988. No soil stability problems are anticipated as long as backline is kept below the cliff area.
*	<input checked="" type="checkbox"/> Y	
	Visual	
	<input type="checkbox"/> N	Northern portion of unit will not meet partial retention VQO as documented in SEIS.
*	<input type="checkbox"/> Y	
	Water	
	<input type="checkbox"/> N	No mapped streams cross or directly border the unit. No anticipated water concerns.
*	<input type="checkbox"/> Y	
	Wildlife	
	<input type="checkbox"/> N	Impacts of the unit as planned are not different than those anticipated in the SEIS. No additional mitigation needed.
*	<input type="checkbox"/> Y	

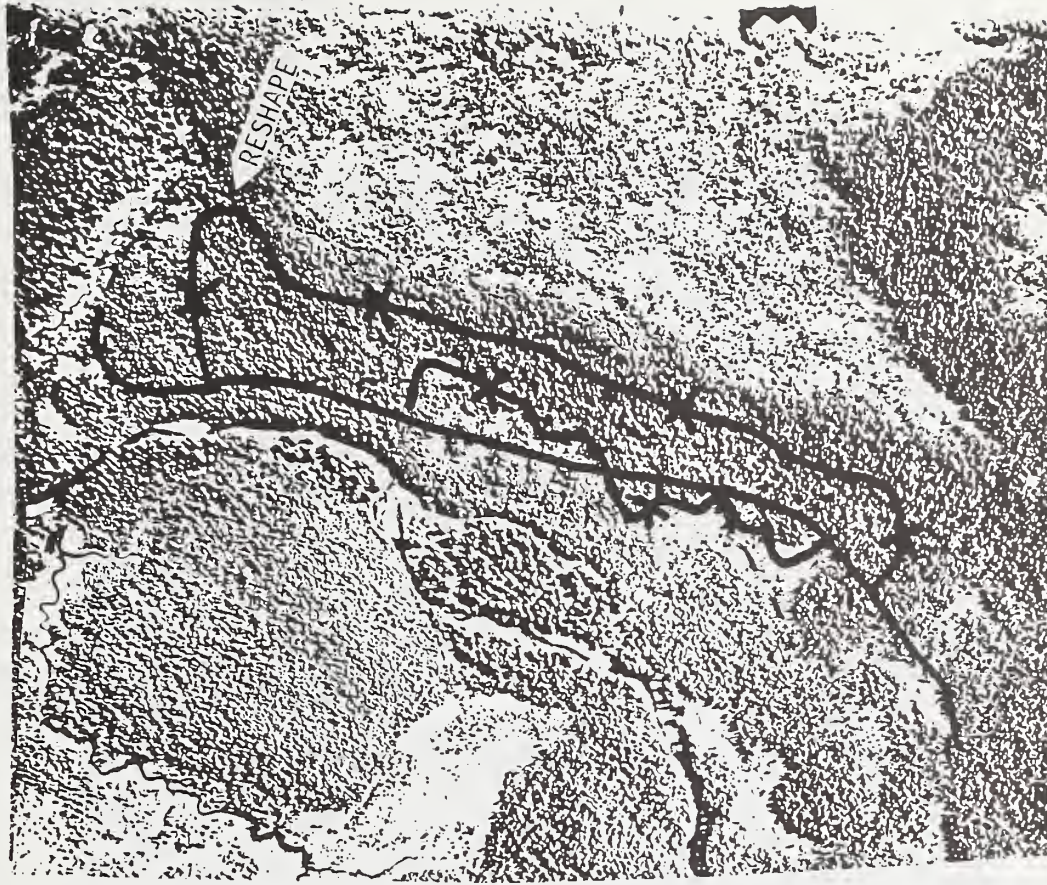
\*For planned unit check box if you want to be notified when unit will be laid out

SA 1900-1  
 (Rev. 3/88)

Layout considerations (windthrow,  
future settings, etc.)  
C. clauses (Independent Sales)

Date: 8-4-77 Flight Line: 11 Roll: 576 Print # 94

↑  
N  
True



Scale 1" = 1320'

Departures from original plan:

# LEGEND

- ✕ — CUTTING BOUNDARY
- SYSTEM ROAD
- - - SPUR ROAD

## UNIT LAYOUT CARD

Card Type: I Planned 10/88 by R.H. Burke  
 (Circle) Date IDT Leader/Timber Rep.  
 II Laid Out by \_\_\_\_\_  
 Date \_\_\_\_\_  
 III Modification by \_\_\_\_\_  
 Date \_\_\_\_\_

Sale Name APC SEIS  
 Unit No. 421-9  
 Acres 21  
 Vol/Acre 24.8 MBF  
 Total Vol 521 MBF  
 Alternative 2,3,4

Reviewed By \_\_\_\_\_ Date \_\_\_\_\_

Approved By \_\_\_\_\_ Date \_\_\_\_\_  
 District Ranger

VCU 421 Compartment 8 Stand Number(s) 83

DATE & INITIALS	REMARKS	For Laid Out & Modified Units: Are the impacts of the unit different than those anticipated in the EIS? If yes, explain.
	Cultural	
*	<input type="checkbox"/> N	No cultural resource concerns.
	<input type="checkbox"/> Y	
	Fisheries	
*	<input type="checkbox"/> N	No Class I or II AHMUs within or approaching unit. No direct effect on fish habitat.
	<input type="checkbox"/> Y	
	Lands	
*	<input type="checkbox"/> N	No concerns.
	<input type="checkbox"/> Y	
	Recreation	
*	<input type="checkbox"/> N	No anticipated impacts to "recreation places".
	<input type="checkbox"/> Y	
	Silviculture (should be last to review)	
*	<input type="checkbox"/> N	Clearcut with natural regeneration and PCT.
	<input checked="" type="checkbox"/> Y	
	Soils	
*	<input type="checkbox"/> N	No apparent soil management problems.
	<input type="checkbox"/> Y	
	Visual	
*	<input type="checkbox"/> N	No visual resource concerns.
	<input type="checkbox"/> Y	
	Water	
*	<input type="checkbox"/> N	No mapped streams cross or directly border the unit. No anticipated water concerns.
	<input type="checkbox"/> Y	
	Wildlife	
*	<input type="checkbox"/> N	Impacts of the unit as planned are not different than those anticipated in the SEIS. No additional mitigation needed.
	<input type="checkbox"/> Y	

\*For planned unit check box if you want to be notified when unit will be laid out

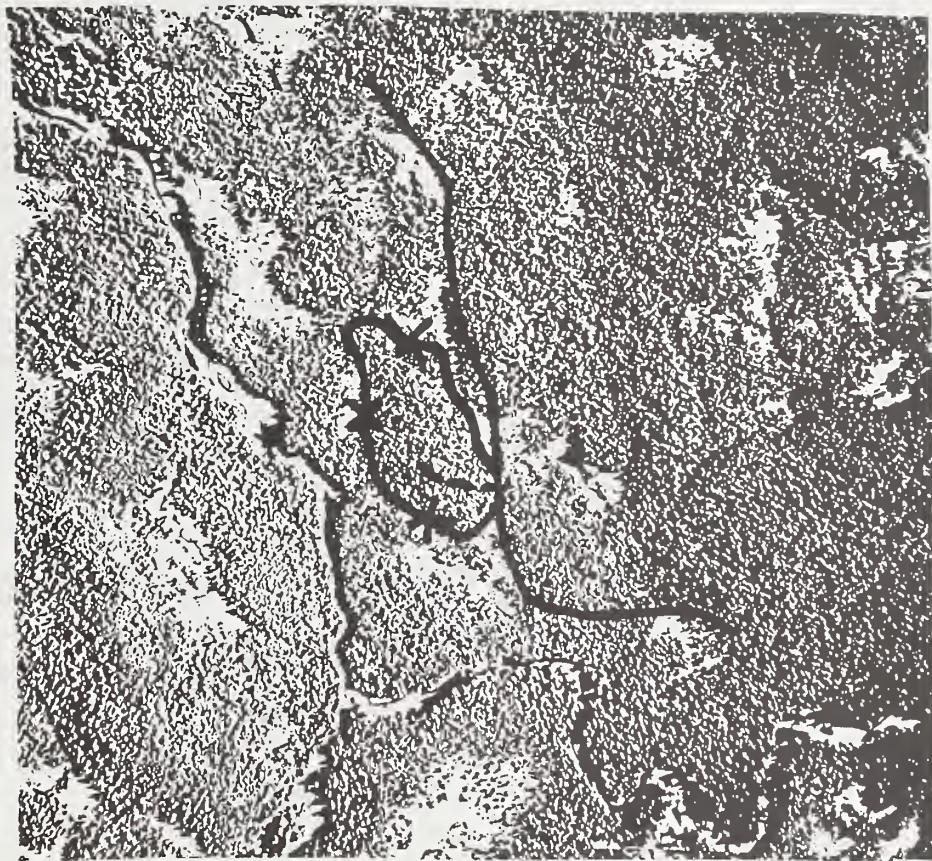
SA 1900-1  
 (Rev. 3/88)



Layout considerations (windthrow,  
future settings, etc.)  
C. clauses (Independent Sales)

Date: 8-4-77 Flight Line: 11 Roll: 576 Print # 94




↑ N  
True



Departures from original plan:

Scale 1" = 1320'

LEGEND

-  CUTTING BOUNDARY
-  SYSTEM ROAD
-  SPUR ROAD

# UNIT LAYOUT CARD

Card Type: I Planned 10/88 by R.H. Burke  
 (Circle) II Laid Out Date IDT Leader/Timber Rep.  
 III Modification Date by  
 Date

Sale Name APC SEIS  
 Unit No. 421-11  
 Acres 92  
 Vol/Acre 40.0 MBF  
 Total Vol 3,680 MBF  
 Alternative 3,4,5

Reviewed By \_\_\_\_\_ Date \_\_\_\_\_  
 Approved By \_\_\_\_\_ Date \_\_\_\_\_  
 District Ranger

VCU 421 \_\_\_\_\_ Compartment 8 \_\_\_\_\_ Stand Number(s) 84 \_\_\_\_\_

DATE & INITIALS	REMARKS	For Laid Out & Modified Units: Are the impacts of the unit different than those anticipated in the EIS? If yes, explain.
	Cultural	
	<input type="checkbox"/> N	No cultural resource concerns.
*	<input type="checkbox"/> Y	
	Fisheries	
	<input type="checkbox"/> N	No Class I or II AHMUs within or approaching unit. No direct effect on fish habitat.
*	<input type="checkbox"/> Y	
	Lands	
	<input type="checkbox"/> N	No concerns.
*	<input type="checkbox"/> Y	
	Recreation	
	<input type="checkbox"/> N	No anticipated impacts to "recreation places".
*	<input type="checkbox"/> Y	
	Silviculture (should be last to review)	
	<input type="checkbox"/> N	Clearcut with natural regeneration and PCT.
*	<input checked="" type="checkbox"/> Y	
	Soils	
	<input type="checkbox"/> N	No apparent soil management problems.
*	<input type="checkbox"/> Y	
	Visual	
	<input type="checkbox"/> N	No visual resource concerns.
*	<input type="checkbox"/> Y	
	Water	
	<input type="checkbox"/> N	No mapped streams cross or directly border the unit. No anticipated water concerns.
*	<input type="checkbox"/> Y	
	Wildlife	
	<input type="checkbox"/> N	Impacts of the unit as planned are not different than those anticipated in the SEIS. No additional mitigation needed.
*	<input type="checkbox"/> Y	

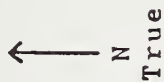
\*For planned unit check box if you want to be notified when unit will be laid out

SA 1900-1  
 (Rev. 3/88)



Layout considerations (windthrow,  
future settings, etc.)  
C. clauses (Independent Sales)




Date: 8-4-77 Flight Line: 11 Roll: 576 Print # 95



Scale 1" = 1320'

Departures from original plan:

LEGEND

-  CUTTING BOUNDARY
-  SYSTEM ROAD
-  SPUR ROAD



## UNIT LAYOUT CARD

Card Type: I Planned 10/88 by R.H. Burke  
 (Circle) Date IDT Leader/Timber Rep.  
 II Laid Out by  
 Date  
 III Modification by  
 Date

Sale Name APC SEIS  
 Unit No. 421-12  
 Acres 85  
 Vol/Acre 35.4 MBF  
 Total Vol 3,006 MBF  
 Alternative 2,3,4,5

Reviewed By \_\_\_\_\_ Date \_\_\_\_\_

Approved By \_\_\_\_\_ Date \_\_\_\_\_  
 District Ranger

VCU 421 \_\_\_\_\_ Compartment 8 \_\_\_\_\_ Stand Number(s) 90 \_\_\_\_\_

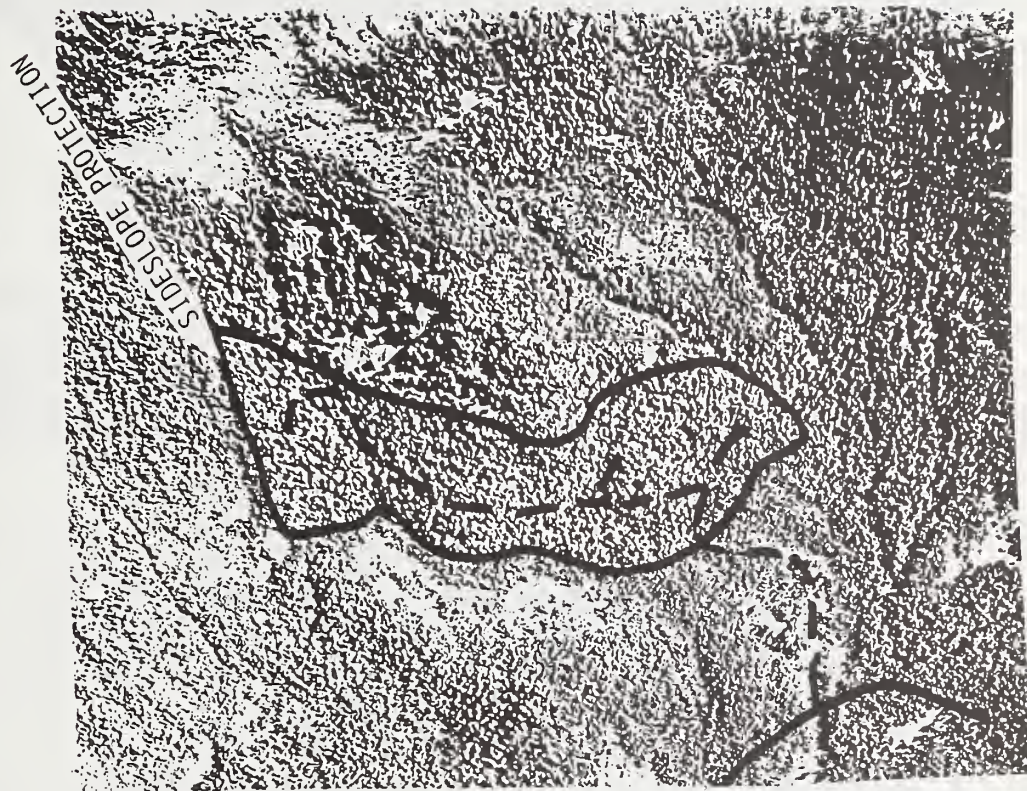
DATE & INITIALS	REMARKS	For Laid Out & Modified Units: Are the impacts of the unit different than those anticipated in the EIS? If yes, explain.
	Cultural	
	<input type="checkbox"/> N	No cultural resource concerns.
*	<input type="checkbox"/> Y	
	Fisheries	
	<input type="checkbox"/> N	No Class I or II AHMUs within or approaching unit. No direct effect on fish habitat.
*	<input type="checkbox"/> Y	
	Lands	
	<input type="checkbox"/> N	No concerns.
*	<input type="checkbox"/> Y	
	Recreation	
	<input type="checkbox"/> N	No anticipated impacts to "recreation places".
*	<input type="checkbox"/> Y	
	Silviculture (should be last to review)	
	<input type="checkbox"/> N	Clearcut with natural regeneration and PCT.
*	<input type="checkbox"/> Y	
X	Soils	
	<input type="checkbox"/> N	No apparent soil management problems.
*	<input type="checkbox"/> Y	
	Visual	
	<input type="checkbox"/> N	No visual resource concerns.
*	<input type="checkbox"/> Y	
	Water	
	<input type="checkbox"/> N	One short segment of a high gradient channel crosses northern tip of unit. Sideslope protection needed, consider partial suspension across channel.
*	<input type="checkbox"/> Y	
	Wildlife	
	<input type="checkbox"/> N	Impacts of the unit as planned are not different than those anticipated in the SEIS. No additional mitigation needed.
*	<input type="checkbox"/> Y	

\*For planned unit check box if you want to be notified when unit will be laid out

SA 1900-1  
 (Rev. 3/88)




LAYOUT CONSIDERATIONS (WINDTHROW,  
FUTURE SETTINGS, ETC.)  
C. CLAUSES (INDEPENDENT SALES)

DATE: 8-4-77 FLIGHT LINE: 11 ROLL 576 PRINT # 96



Scale 1" = 1320'

Departures from original plan:

- LEGEND
-  CUTTING BOUNDARY
  -  SYSTEM ROAD
  -  SPUR ROAD

# UNIT LAYOUT CARD

Card Type: I Planned 10/88 by R.H. Burke  
 (Circle) Date IDT Leader/Timber Rep.  
 II Laid Out by  
 Date  
 III Modification by  
 Date

Sale Name APC SEIS  
 Unit No. 421-13  
 Acres 30  
 Vol/Acre 40.0 MBF  
 Total Vol 1,200 MBF  
 Alternative 2,3,4,5

Reviewed By Date

Approved By District Ranger Date

VCU 421 Compartment 8 Stand Number(s) 84

DATE & INITIALS	REMARKS	For Laid Out & Modified Units: Are the impacts of the unit different than those anticipated in the EIS? If yes, explain.
	Cultural	
	<input type="checkbox"/> N	No cultural resource concerns.
*	<input type="checkbox"/> Y	
	Fisheries	
	<input type="checkbox"/> N	Unit has Class II AHMU approaching, but seperated by 100' buffer on NW corner. Wind firm buffer will protect fish habitat.
*	<input checked="" type="checkbox"/> Y	
	Lands	
	<input type="checkbox"/> N	No concerns.
*	<input type="checkbox"/> Y	
	Recreation	
	<input type="checkbox"/> N	No anticipated impacts to "recreation places".
*	<input type="checkbox"/> Y	
	Silviculture (should be last to review)	
	<input type="checkbox"/> N	Clearcut with natural regeneration and PCT.
*	<input checked="" type="checkbox"/> Y	
	Soils	
	<input type="checkbox"/> N	No apparent soil management problems.
*	<input type="checkbox"/> Y	
	Visual	
	<input type="checkbox"/> N	No visual resource concerns.
*	<input type="checkbox"/> Y	
	Water	
	<input type="checkbox"/> N	Short high gradient channel crosses northern tip of unit. Partial suspension required for side slope protection.
*	<input type="checkbox"/> Y	
	Wildlife	
	<input type="checkbox"/> N	Impacts of the unit as planned are not different than those anticipated in the SEIS. No additional mitigation needed.
*	<input type="checkbox"/> Y	

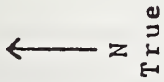
\*For planned unit check box if you want to be notified when unit will be laid out

SA 1900-1  
 (Rev. 3/88)



Layout considerations (windthrow,  
future settings, etc.)  
C. clauses (Independent Sales)




Date: 8-4-77 Flight Line: 11 Roll: 576 Print # 96



Scale 1" = 1320'

Departures from original plan:

LEGEND

-  CUTTING BOUNDARY
-  SYSTEM ROAD
-  SPUR ROAD

## UNIT LAYOUT CARD

Card Type: I Planned 10/88 by R.H. Burke  
 (Circle) II Laid Out Date IDT Leader/Timber Rep.  
 III Modification Date by

Sale Name APC SEIS  
 Unit No. 421-14  
 Acres 71  
 Vol/Acre 40.0 MBF  
 Total Vol 2,840 MBF  
 Alternative 2,3,4,5

Reviewed By \_\_\_\_\_ Date \_\_\_\_\_

Approved By \_\_\_\_\_ Date \_\_\_\_\_  
 District Ranger

VCU 421 Compartment 8 Stand Number(s) 84

DATE & INITIALS	REMARKS	For Laid Out & Modified Units: Are the impacts of the unit different than those anticipated in the EIS? If yes, explain.
	Cultural	
*	<input type="checkbox"/> N	No cultural resource concerns.
	<input type="checkbox"/> Y	
	Fisheries	
*	<input type="checkbox"/> N	No Class I or II AHMUs within or approaching unit. No direct effect on fish habitat.
	<input type="checkbox"/> Y	
	Lands	
*	<input type="checkbox"/> N	No concerns.
	<input type="checkbox"/> Y	
	Recreation	
*	<input type="checkbox"/> N	No anticipated impacts to "recreation places".
	<input type="checkbox"/> Y	
	Silviculture (should be last to review)	
*	<input type="checkbox"/> N	Clearcut with natural regeneration and PCT.
	<input checked="" type="checkbox"/> Y	
	Soils	
*	<input type="checkbox"/> N	No apparent soil management problems.
	<input type="checkbox"/> Y	
	Visual	
*	<input type="checkbox"/> N	No visual resource concerns.
	<input type="checkbox"/> Y	
	Water	
*	<input type="checkbox"/> N	There is a Class III stream (A1) crossing southern part of the unit. Splitline required to protect sideslope and streambank stability.
	<input type="checkbox"/> Y	
	Wildlife	
*	<input type="checkbox"/> N	Impacts of the unit as planned are not different than those anticipated in the SEIS. No additional mitigation needed.
	<input type="checkbox"/> Y	

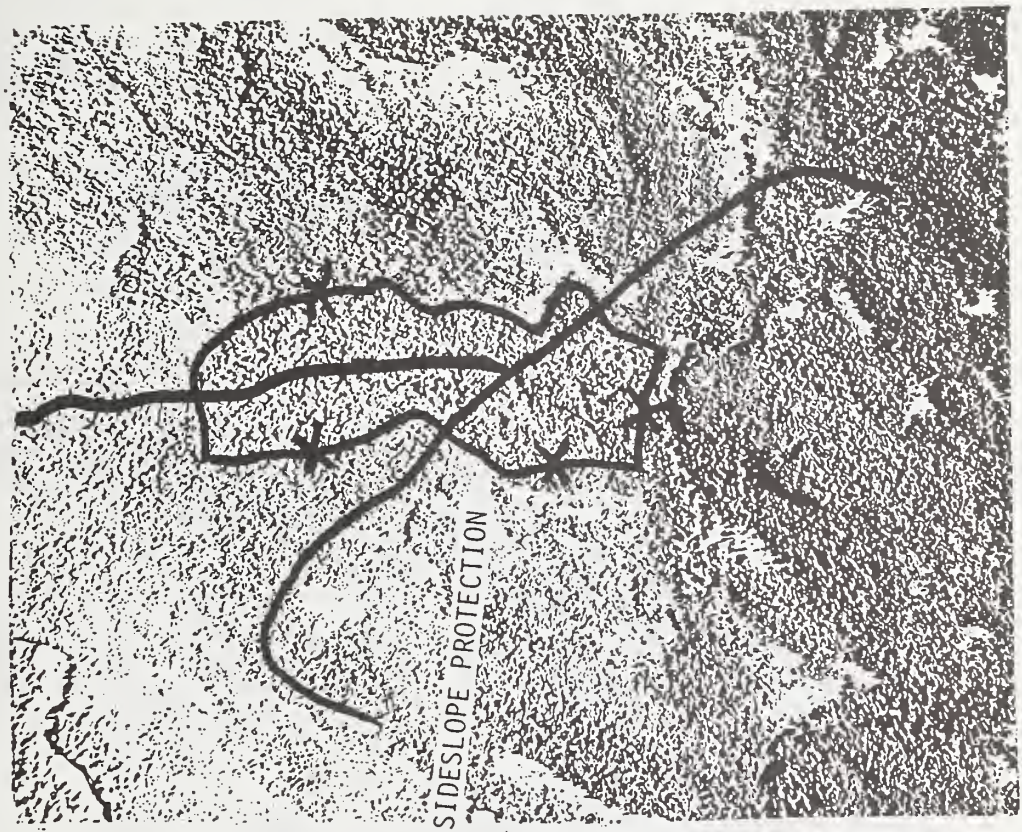
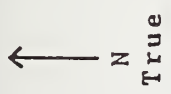
\*For planned unit check box if you want to be notified when unit will be laid out

SA 1900-1  
 (Rev. 3/88)



Layout considerations (windthrow,  
future settings, etc.)  
C. clauses (Independent Sales)

Date: 8-4-77 Flight Line: 11 Roll: 576 Print #96



Scale 1" = 1320'

Departures from original plan:

- LEGEND
- CUTTING BOUNDARY
  - SYSTEM ROAD
  - SPUR ROAD



## UNIT LAYOUT CARD

Card Type: I Planned 10/88 by R.H. Burke  
 (Circle) II Laid Out Date IDT Leader/Timber Rep.  
 III Modification Date by

Sale Name APC SEIS  
 Unit No. 421-15  
 Acres 15  
 Vol/Acre 59.3 MBF  
 Total Vol 890 MBF  
 Alternative 2,3,4,5

Reviewed By \_\_\_\_\_ Date \_\_\_\_\_

Approved By \_\_\_\_\_ Date \_\_\_\_\_  
 District Ranger

VCU 421 \_\_\_\_\_ Compartment 8 \_\_\_\_\_ Stand Number(s) 76 \_\_\_\_\_

DATE & INITIALS	REMARKS	For Laid Out & Modified Units: Are the impacts of the unit different than those anticipated in the EIS? If yes, explain.
	Cultural	
*	<input type="checkbox"/> N	No cultural resource concerns.
	<input type="checkbox"/> Y	
	Fisheries	
*	<input type="checkbox"/> N	Planned unit has a 100' buffer along north side separating unit from Class I AHMU. Wind firm buffer will protect fish habitat.
X	<input checked="" type="checkbox"/> Y	
	Lands	
*	<input type="checkbox"/> N	No concerns.
	<input type="checkbox"/> Y	
	Recreation	
*	<input type="checkbox"/> N	No anticipated impacts to "recreation places".
	<input type="checkbox"/> Y	
	Silviculture (should be last to review)	
*	<input type="checkbox"/> N	Clearcut with natural regeneration and PCT.
X	<input checked="" type="checkbox"/> Y	
	Soils	
*	<input type="checkbox"/> N	Riparian vegetation on alluvial soils in north 1/2 of unit. Stream bank protection required on flood channels in unit. Field verification needed.
X	<input checked="" type="checkbox"/> Y	
	Visual	
*	<input type="checkbox"/> N	No visual resource concerns.
	<input type="checkbox"/> Y	
	Water	
*	<input type="checkbox"/> N	Buffer required for floodplain channel in norther part of unit to protect streambank stability and future sources of LOD.
	<input type="checkbox"/> Y	
	Wildlife	
*	<input type="checkbox"/> N	Impacts of the unit as planned are not different than those anticipated in the SEIS. No additional mitigation needed.
	<input type="checkbox"/> Y	

\*For planned unit check box if you want to be notified when unit will be laid out

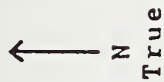
SA 1900-1  
 (Rev. 3/88)

Unit Number 421-15

Layout considerations (windthrow,  
future settings, etc.)  
C. clauses (Independent Sales)

Project Area Map

Date: 8-4-77 Flight Line: 11 Roll: 576 Print # 96



Departures from original plan:

Scale 1" = 1320'

LEGEND

- CUTTING BOUNDARY
- SYSTEM ROAD
- SPUR ROAD

# UNIT LAYOUT CARD

Card Type: I Planned 10/88 by R.H. Burke  
 (Circle) II Laid Out Date IDT Leader/Timber Rep.  
 III Modification Date by

Sale Name APC SEIS  
 Unit No. 421-16  
 Acres 11  
 Vol/Acre 40.0 MBF  
 Total Vol 440 MBF  
 Alternative 2,3,4,5

Reviewed By Date  
 Approved By District Ranger Date

VCU 421 Compartment 8 Stand Number(s) 87

DATE & INITIALS	REMARKS	For Laid Out & Modified Units: Are the impacts of the unit different than those anticipated in the EIS? If yes, explain.
	Cultural	
*	<input type="checkbox"/> N	No cultural resource concerns.
	<input type="checkbox"/> Y	
	Fisheries	
*	<input type="checkbox"/> N	No Class I or II AHMUs within or approaching unit. No direct effect on fish habitat.
	<input type="checkbox"/> Y	
	Lands	
*	<input type="checkbox"/> N	No concerns.
	<input type="checkbox"/> Y	
	Recreation	
*	<input type="checkbox"/> N	No anticipated impacts to "recreation places".
	<input type="checkbox"/> Y	
	Silviculture (should be last to review)	
*	<input type="checkbox"/> N	Clearcut with natural regeneration and PCT.
	<input checked="" type="checkbox"/> Y	
	Soils	
*	<input type="checkbox"/> N	Moderately wet site with glacial till soils. No apparent soil management problems.
	<input type="checkbox"/> Y	
	Visual	
*	<input type="checkbox"/> N	No visual resource concerns.
	<input type="checkbox"/> Y	
	Water	
*	<input type="checkbox"/> N	No mapped streams cross or directly border the unit. No anticipated water concerns.
	<input type="checkbox"/> Y	
	Wildlife	
*	<input type="checkbox"/> N	Impacts of the unit as planned are not different than those anticipated in the SEIS. No additional mitigation needed.
	<input type="checkbox"/> Y	

\*For planned unit check box if you want to be notified when unit will be laid out

SA 1900-1  
 (Rev. 3/88)



Unit Number 421-16

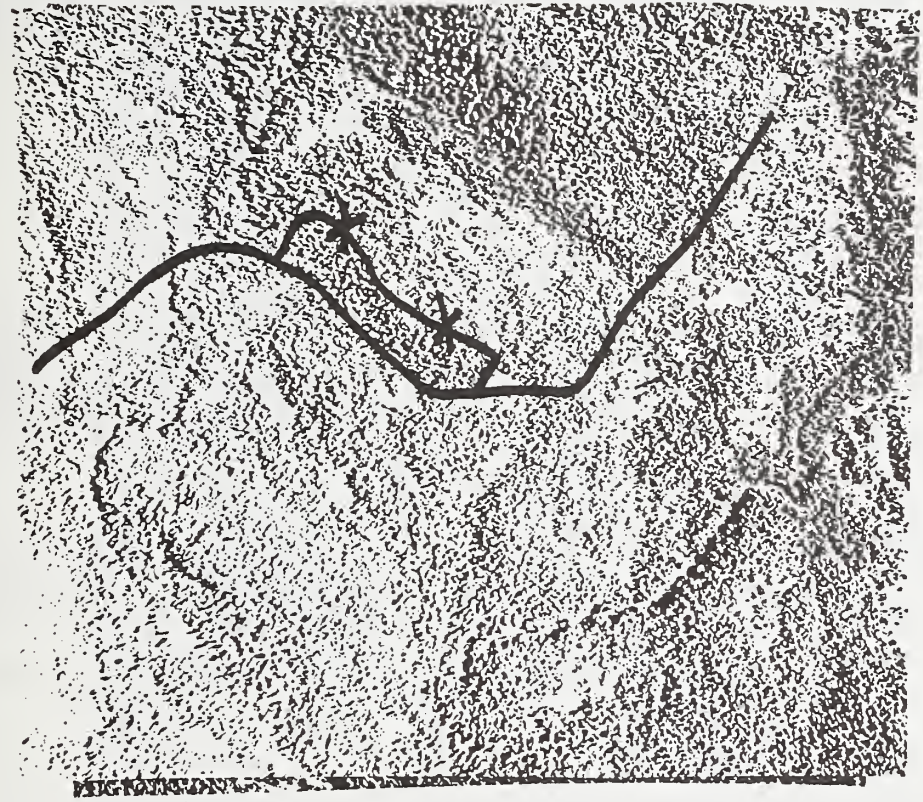
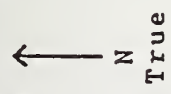
Project Area Map

Layout considerations (windthrow, future settings, etc.)  
C. clauses (Independent Sales)

Take all timber on the east side of the road.

Departures from original plan:

Date: 8-4-77 Flight Line: 11 Roll: 576 Print # 96



Scale 1" = 1320'

LEGEND

- CUTTING BOUNDARY
- SYSTEM ROAD
- SPUR ROAD

141.

## UNIT LAYOUT CARD

Card Type: I Planned 10/88 by R.H. Burke  
 (Circle) Date IDT Leader/Timber Rep.  
 II Laid Out by  
 Date  
 III Modification by  
 Date

Sale Name APC SEIS  
 Unit No. 421-17  
 Acres 25  
 Vol/Acre 24.8 MBF  
 Total Vol 620 MBF  
 Alternative 2,3,4,5

Reviewed By \_\_\_\_\_ Date \_\_\_\_\_

Approved By \_\_\_\_\_ Date \_\_\_\_\_  
 District Ranger

VCU 421 Compartment 8 Stand Number(s) 146

DATE & INITIALS	REMARKS	For Laid Out & Modified Units: Are the impacts of the unit different than those anticipated in the EIS? If yes, explain.
	Cultural	
	<input type="checkbox"/> N	No cultural resource concerns.
*	<input type="checkbox"/> Y	
	Fisheries	
	<input type="checkbox"/> N	No Class I or II AHMUs within or approaching unit. No direct effect on fish habitat.
*	<input type="checkbox"/> Y	
	Lands	
	<input type="checkbox"/> N	No concerns.
*	<input type="checkbox"/> Y	
	Recreation	
	<input type="checkbox"/> N	No anticipated impacts to "recreation places".
*	<input type="checkbox"/> Y	
	Silviculture (should be last to review)	
	<input type="checkbox"/> N	Clearcut with natural regeneration and PCT.
*	<input type="checkbox"/> Y	
X	Soils	
	<input type="checkbox"/> N	Moderate to high potential for landslide potential in upper 1/2 of unit. Needs on site verification and perscription for soil stability; partial suspension at a minimum.
*	<input type="checkbox"/> Y	
X	Visual	
	<input type="checkbox"/> N	No visual resource concerns.
*	<input type="checkbox"/> Y	
	Water	
	<input type="checkbox"/> N	No mapped streams cross or directly border the unit. No anticipated water concerns.
*	<input type="checkbox"/> Y	
	Wildlife	
	<input type="checkbox"/> N	Impacts of the unit as planned are not different than those anticipated in the SEIS. No additional mitigation needed.
*	<input type="checkbox"/> Y	

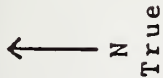
\*For planned unit check box if you want to be notified when unit will be laid out

SA 1900-1  
 (Rev. 3/88)



Layout considerations (windthrow,  
future settings, etc.)  
C. clauses (Independent Sales)





Date: 8-4-77 Flight Line: 11 Roll: 576 Print # 97



Scale 1" = 1320'

Departures from original plan:

LEGEND

-   CUTTING BOUNDARY
-  SYSTEM ROAD
-  SPUR ROAD



## UNIT LAYOUT CARD

Card Type: I Planned 10/88 by R.H. Burke  
 (Circle) Date IDT Leader/Timber Rep.  
 II Laid Out by  
 Date  
 III Modification by  
 Date

Sale Name APC SEIS  
 Unit No. 421-18  
 Acres 47  
 Vol/Acre 32.6 MBF  
 Total Vol 1,530 MBF  
 Alternative 2,3,4,5

Reviewed By \_\_\_\_\_ Date \_\_\_\_\_

Approved By \_\_\_\_\_ Date \_\_\_\_\_  
 District Ranger

VCU 421 \_\_\_\_\_ Compartment 8 \_\_\_\_\_ Stand Number(s) 108 \_\_\_\_\_

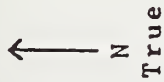
DATE & INITIALS	REMARKS	For Laid Out & Modified Units: Are the impacts of the unit different than those anticipated in the EIS? If yes, explain.
	Cultural	
	<input type="checkbox"/> N	No cultural resource concerns.
*	<input type="checkbox"/> Y	
	Fisheries	
	<input type="checkbox"/> N	Planned unit has 100' buffer along class I AHMU in SW corner of unit. Wind firm buffer will protect fish habitat.
*	<input type="checkbox"/> Y	
	Lands	
	<input type="checkbox"/> N	No concerns.
*	<input type="checkbox"/> Y	
	Recreation	
	<input type="checkbox"/> N	No anticipated impacts to "recreation places".
*	<input type="checkbox"/> Y	
	Silviculture (should be last to review)	
	<input type="checkbox"/> N	Clearcut with natural regeneration and PCT.
*	<input type="checkbox"/> Y	
X	Soils	
	<input type="checkbox"/> N	No apparent soil management problems.
*	<input type="checkbox"/> Y	
	Visual	
	<input type="checkbox"/> N	No visual resource concerns.
*	<input type="checkbox"/> Y	
	Water	
	<input type="checkbox"/> N	There is a floodplain stream bordering the SW corner of the unit. The planned buffer will sufficiently protect streambank stability and allow for future sources of LOD.
*	<input type="checkbox"/> Y	
	Wildlife	
	<input type="checkbox"/> N	Impacts of the unit as planned are not different than those anticipated in the SEIS. Consider closing road to the south-east of unit 421-15 until hiding cover is recovered.
*	<input type="checkbox"/> Y	

\*For planned unit check box if you want to be notified when unit will be laid out

SA 1900-1  
 (Rev. 3/88)

Layout considerations (windthrow,  
future settings, etc.)  
C. clauses (Independent Sales)




Date: 8-4-77 Flight Line: 11 Roll: 576 Print # 99



Departures from original plan:

Scale 1" = 1320'

LEGEND

-  CUTTING BOUNDARY
-  SYSTEM ROAD
-  SPUR ROAD

## UNIT LAYOUT CARD

Card Type: I Planned 10/88 by R.H. Burke  
 (Circle) II Laid Out Date IDT Leader/Timber Rep.  
 III Modification Date by  
 Date

Sale Name APC SEIS  
 Unit No. 421-19  
 Acres 104  
 Vol/Acre 38.7 MBF  
 Total Vol 4,023 MBF  
 Alternative 2,3,4,5

Reviewed By \_\_\_\_\_ Date \_\_\_\_\_

Approved By \_\_\_\_\_ Date \_\_\_\_\_  
 District Ranger

VCU 421 \_\_\_\_\_ Compartment 8 \_\_\_\_\_ Stand Number(s) 107 \_\_\_\_\_

DATE & INITIALS	REMARKS	For Laid Out & Modified Units: Are the impacts of the unit different than those anticipated in the EIS? If yes, explain.
	Cultural	
	<input type="checkbox"/> N	No cultural resource concerns.
*	<input type="checkbox"/> Y	
	Fisheries	
	<input type="checkbox"/> N	No Class I or II AHMUs within or approaching unit. No direct effect on fish habitat.
*	<input type="checkbox"/> Y	
	Lands	
	<input type="checkbox"/> N	No concerns.
*	<input type="checkbox"/> Y	
	Recreation	
	<input type="checkbox"/> N	No anticipated impacts to "recreation places".
*	<input type="checkbox"/> Y	
	Silviculture (should be last to review)	
	<input type="checkbox"/> N	Clearcut with natural regeneration and PCT.
*	<input checked="" type="checkbox"/> Y	
	Soils	
	<input type="checkbox"/> N	Moderately high stability hazard on upper (NE) portion. Partial suspension required on upper 1/3 of unit (approx 35 ac)
*	<input type="checkbox"/> Y	
	Visual	
	<input type="checkbox"/> N	No visual resource concerns.
*	<input type="checkbox"/> Y	
	Water	
	<input type="checkbox"/> N	No mapped streams cross or directly border the unit. No anticipated water concerns.
*	<input type="checkbox"/> Y	
	Wildlife	
	<input type="checkbox"/> N	Impacts of the unit as planned are not different than those anticipated in the SEIS. Unit and road are adjacent to travel corridor between drainages. Consider road closure.
*	<input type="checkbox"/> Y	

\*For planned unit check box if you want to be notified when unit will be laid out

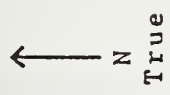
SA 1900-1  
 (Rev. 3/88)



Layout considerations (windthrow, future settings, etc.)  
C. clauses (Independent Sales)

Take all timber tributary to the spur.  
Do not isolate timber.

Departures from original plan:



Scale 1" = 1320'

LEGEND

- CUTTING BOUNDARY
- SYSTEM ROAD
- SPUR ROAD

## UNIT LAYOUT CARD

Card Type: I Planned 10/88 by R.H. Burke  
 (Circle) II Laid Out Date IDT Leader/Timber Rep.  
 III Modification Date by

Sale Name APC SEIS  
 Unit No. 421-31  
 Acres 111  
 Vol/Acre 37.7 MBF  
 Total Vol 4,182 MBF  
 Alternative 2,3,4,5

Reviewed By \_\_\_\_\_ Date \_\_\_\_\_

Approved By \_\_\_\_\_ Date \_\_\_\_\_  
 District Ranger

VCU 421 \_\_\_\_\_ Compartment 8 \_\_\_\_\_ Stand Number(s) 93 \_\_\_\_\_

DATE & INITIALS	REMARKS	For Laid Out & Modified Units: Are the impacts of the unit different than those anticipated in the EIS? If yes, explain.
	Cultural	
	<input type="checkbox"/> N	No cultural resource concerns.
*	<input type="checkbox"/> Y	
	Fisheries	
	<input type="checkbox"/> N	No Class I or II AHMUs within or approaching unit. No direct effect on fish habitat.
*	<input type="checkbox"/> Y	
	Lands	
	<input type="checkbox"/> N	No concerns.
*	<input type="checkbox"/> Y	
	Recreation	
	<input type="checkbox"/> N	No anticipated impacts to "recreation places".
*	<input type="checkbox"/> Y	
	Silviculture (should be last to review)	
	<input type="checkbox"/> N	Clearcut with natural regeneration and PCT.
*	<input type="checkbox"/> Y	
X	Soils	
	<input type="checkbox"/> N	No apparent soil management problems.
*	<input type="checkbox"/> Y	
	Visual	
	<input type="checkbox"/> N	No visual resource concerns.
*	<input type="checkbox"/> Y	
	Water	
	<input type="checkbox"/> N	One short segment of high gradient channel (A1) in the north quarter of the unit. Splitline required for sideslope protection.
*	<input type="checkbox"/> Y	
	Wildlife	
	<input type="checkbox"/> N	Impacts of the unit as planned are not different than those anticipated in the SEIS. No additional mitigation needed.
*	<input type="checkbox"/> Y	

\*For planned unit check box if you want to be notified when unit will be laid out

SA 1900-1  
 (Rev. 3/88)



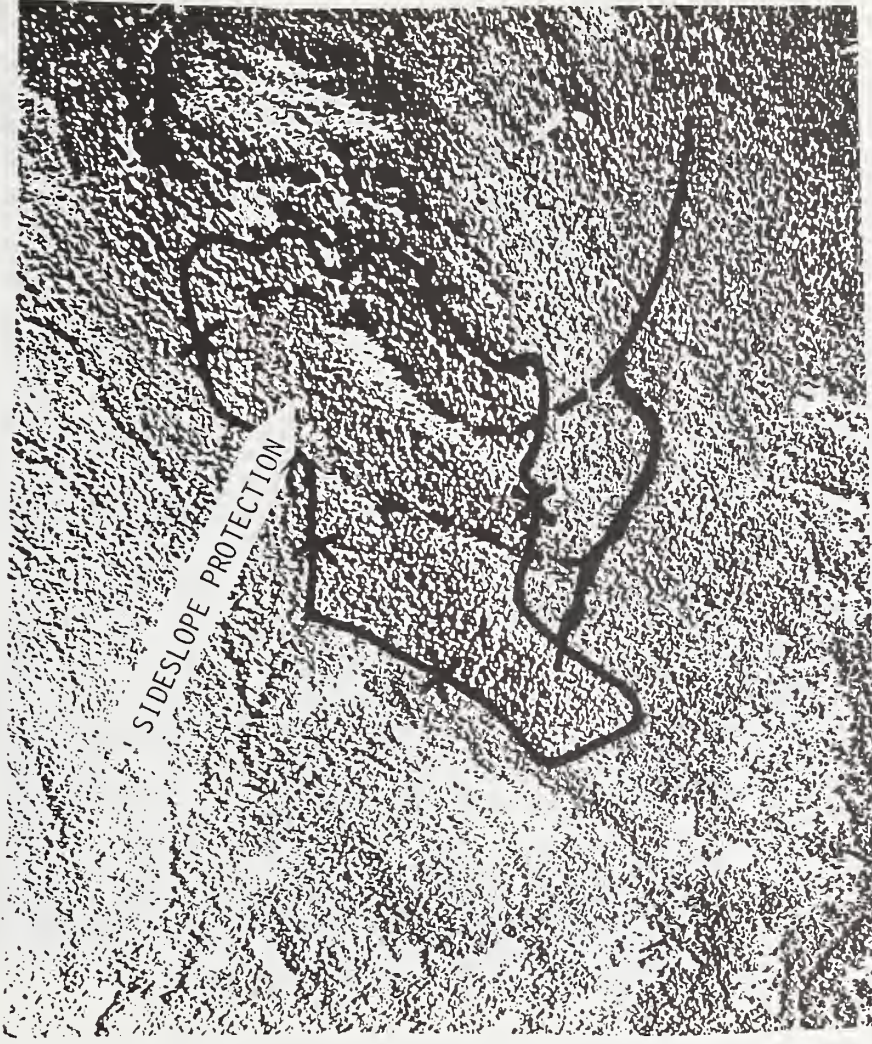
Layout considerations (windthrow,  
future settings, etc.)  
C. clauses (Independent Sales)

Take intire stand. Do not isolate timber.

Departures from original plan:

Date: 8-4-77 Flight Line: 11 Roll: 576 Print # 97

↑ N  
True



Scale 1" = 1320'

# LEGEND

- ✕ — ✕ CUTTING BOUNDARY
- SYSTEM ROAD
- - - SPUR ROAD



## UNIT LAYOUT CARD

Card Type: I Planned 10/88 by R.H. Burke  
 (Circle) II Laid Out Date IDT Leader/Timber Rep.  
 III Modification Date by  
 Date

Sale Name APC SEIS  
 Unit No. 421-36  
 Acres 97  
 Vol/Acre 52.1 MBF  
 Total Vol 5,059 MBF  
 Alternative 2,3,4,5

Reviewed By \_\_\_\_\_ Date \_\_\_\_\_

Approved By \_\_\_\_\_ Date \_\_\_\_\_  
 District Ranger

VCU 421 Compartment 8 Stand Number(s) 58

DATE & INITIALS	REMARKS	For Laid Out & Modified Units: Are the impacts of the unit different than those anticipated in the EIS? If yes, explain.
	Cultural	
	<input type="checkbox"/> N	No cultural resource concerns.
*	<input type="checkbox"/> Y	
	Fisheries	
	<input type="checkbox"/> N	No Class I or II AHMUs within or approaching unit. No direct effect on fish habitat.
*	<input type="checkbox"/> Y	
	Lands	
	<input type="checkbox"/> N	No concerns.
*	<input type="checkbox"/> Y	
	Recreation	
	<input type="checkbox"/> N	No anticipated impacts to "recreation places".
*	<input type="checkbox"/> Y	
	Silviculture (should be last to review)	
	<input type="checkbox"/> N	Clearcut with natural regeneration and PCT.
*	<input type="checkbox"/> Y	
X	Soils	
	<input type="checkbox"/> N	No apparent soil management problems.
*	<input type="checkbox"/> Y	Good site.
	Visual	
	<input type="checkbox"/> N	No visual resource concerns.
*	<input type="checkbox"/> Y	
	Water	
	<input type="checkbox"/> N	One segment of a high gradient channel crosses southern part of unit. Splitline required for sideslope protection.
*	<input type="checkbox"/> Y	
X	Wildlife	
	<input type="checkbox"/> N	Impacts of the unit as planned are not different than those anticipated in the SEIS. No additional mitigation needed.
*	<input type="checkbox"/> Y	

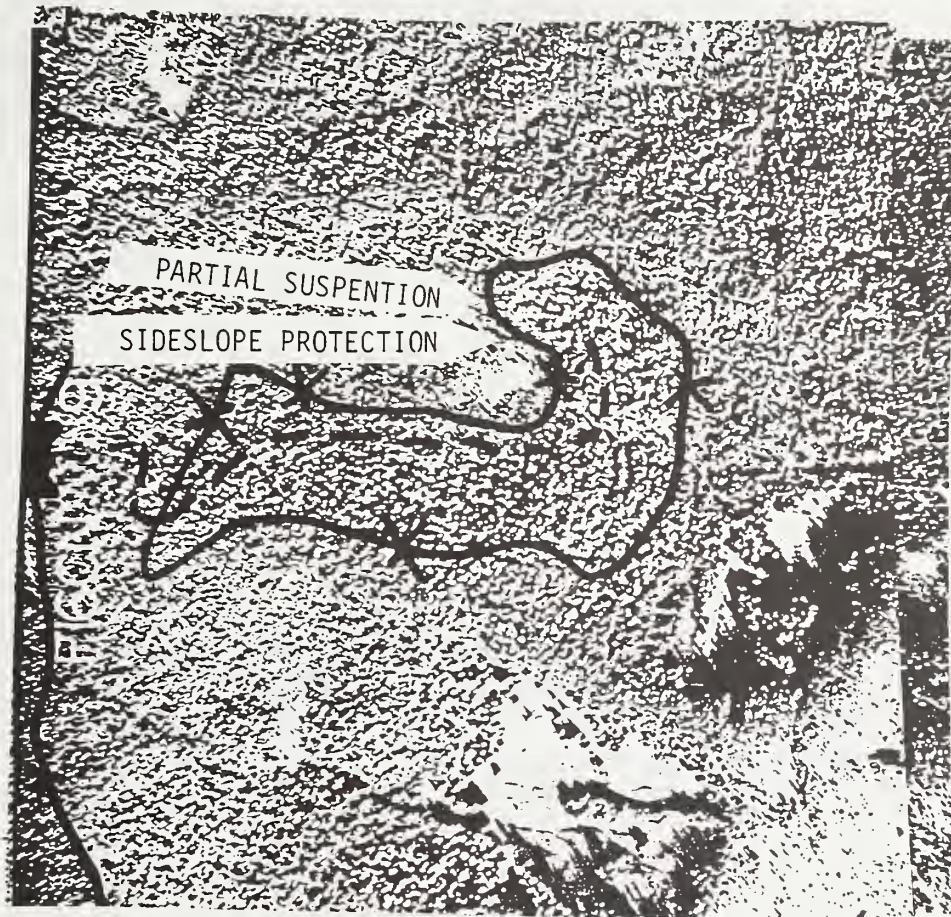
\*For planned unit check box if you want to be notified when unit will be laid out

SA 1900-1  
 (Rev. 3/88)

Layout considerations (windthrow,  
future settings, etc.)  
C. clauses (Independent Sales)

Date: 8-4-77 Flight Line: 9 Roll: 676 Print # 140

↑  
N  
True



Scale 1" = 1320'

Departures from original plan:

LEGEND

— X —	CUTTING BOUNDARY
—	SYSTEM ROAD
- - -	SPUR ROAD

## UNIT LAYOUT CARD

Sale Name APC SEIS  
 Unit No. 420-9  
 Acres 75  
 Vol/Acre 34.1 MBF  
 Total Vol 1,888 MBF  
 Alternative 2,3,4,5

Card Type: I Planned 10/88 by R.H. Burke  
 (Circle) Date IDT Leader/Timber Rep.  
 II Laid Out by \_\_\_\_\_  
 Date \_\_\_\_\_  
 III Modification by \_\_\_\_\_  
 Date \_\_\_\_\_

Reviewed By \_\_\_\_\_ Date \_\_\_\_\_

Approved By \_\_\_\_\_ Date \_\_\_\_\_  
 District Ranger

VCU 420 Compartment 7 Stand Number(s) 169/175

DATE & INITIALS	REMARKS	For Laid Out & Modified Units: Are the impacts of the unit different than those anticipated in the EIS? If yes, explain.
	Cultural	
	<input type="checkbox"/> N	No cultural resource concerns.
*	<input type="checkbox"/> Y	
	Fisheries	
	<input type="checkbox"/> N	South side of existing unit approaches Brown's Creek above barrier. We plan to ladder barrier. 100' wind firm wind firm buffer wi;; protect fish habitat in this Class I AHMU.
*	<input checked="" type="checkbox"/> Y	
	Lands	
	<input type="checkbox"/> N	No concerns.
*	<input type="checkbox"/> Y	
	Recreation	
	<input type="checkbox"/> N	No anticipated impacts to "recreation places".
*	<input type="checkbox"/> Y	
	Silviculture (should be last to review)	
	<input type="checkbox"/> N	Clearcut with natural regeneration and PCT.
*	<input checked="" type="checkbox"/> Y	
	Soils	
	<input type="checkbox"/> N	Keep north boundary of unit below oversteepened slope; less than 75%.
*	<input checked="" type="checkbox"/> Y	
	Visual	
	<input type="checkbox"/> N	Unit works well with the existing visual condition of the area.
*	<input type="checkbox"/> Y	
	Water	
	<input type="checkbox"/> N	No mapped streams cross or directly border unit. No anticipated water concerns given planned buffer.
*	<input type="checkbox"/> Y	
	Wildlife	
	<input type="checkbox"/> N	Mitigate loss of old growth by retaining snags where consistent with safety considerations. Conduct post-harvest assessment of potential habitat improvement projects.
*	<input type="checkbox"/> Y	

\*For planned unit check box if you want to be notified when unit will be laid out



KUIU SEIS  
ROAD LOCATION AND CONSTRUCTION RECOMMENDATIONS

ROAD NUMBER 46042

RESOURCE

RESOURCE CONSIDERATIONS/RECOMMENDATIONS

CULTURAL: No cultural resource concerns. No survey recommended.

LR  
11/17/37

FISHERIES: Planned road does not cross or parallel inventoried Class 1 or 2 AHMUs.  
RSA

11-21-53

LANDS:

RECREATION: Additional motorized access to previously undeveloped country.  
No significant impacts anticipated at this time

SOILS: Avoid sitegrading on areas with slopes in excess of 60% in sections 30 and 31. Standard erosion control practices apply.

TIMBER (Silviculture/Logging Systems):

Keep road open for admin use.

VISUAL:

No visual concerns.

DB

12/3/55

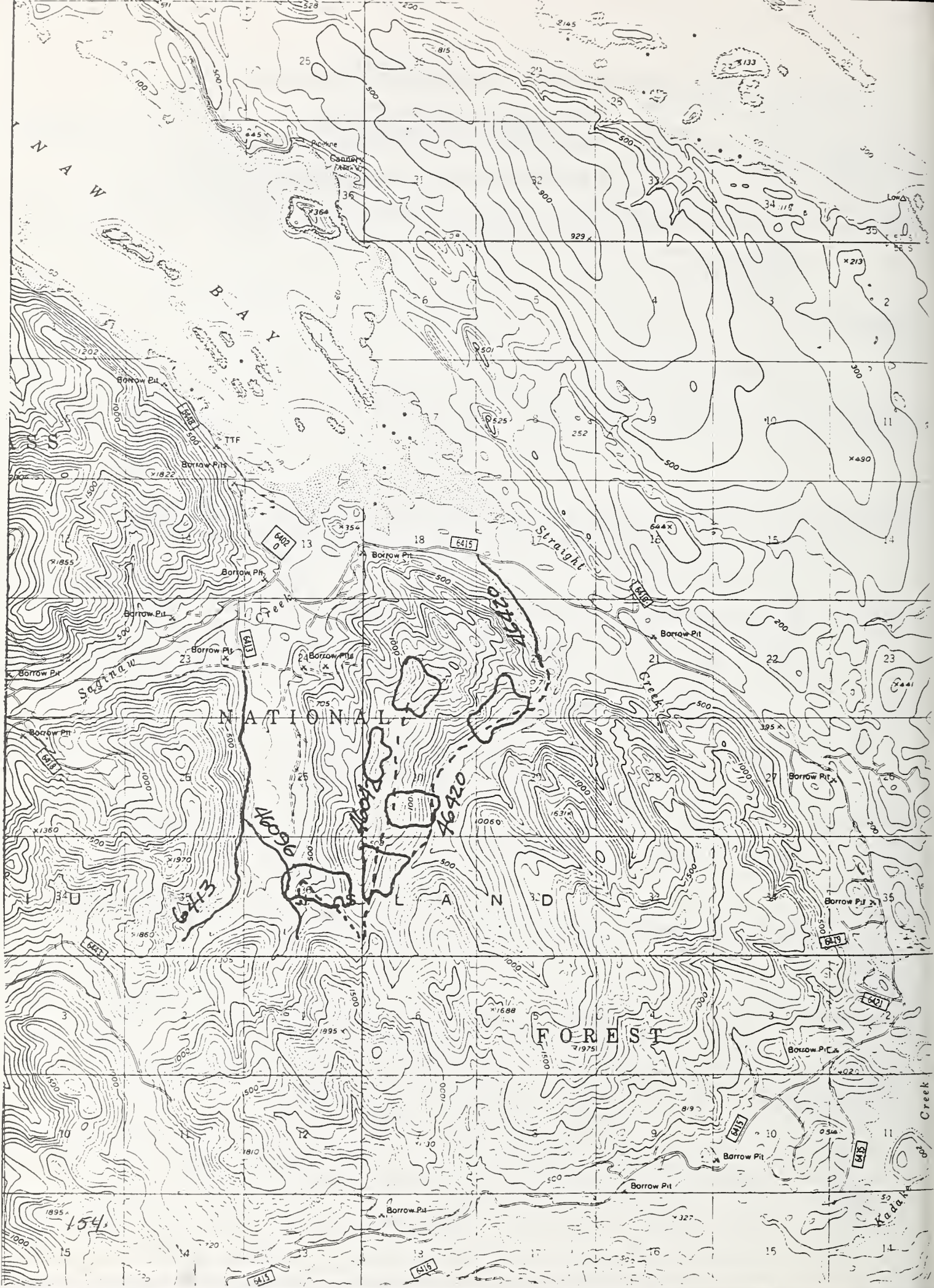
WATER: No mapped streams will be crossed by planned roads. No anticipated water concerns.

CMJ  
11/29/80

WILDLIFE: may give easier access to areas for bear trapping & deer hunting. Not open up in the future.

LR 11/15/80

Maintain dialogue with public and AFGD.  
If this becomes a problem, it over-horizon  
consider road closure program. Key is public  
involvement early and often. RD 8/89





KUIU SEIS  
ROAD LOCATION AND CONSTRUCTION RECOMMENDATIONS

ROAD NUMBER 46202

RESOURCE

RESOURCE CONSIDERATIONS/RECOMMENDATIONS

CULTURAL: No cultural resource concerns. No survey recommended.

JR  
11/17/88

FISHERIES: The planned road does not cross and is not parallel to inventoried Class 1 or 2  
RSA  
11-21-88 AHM's.

LANDS:

RECREATION: Additional enhanced access to for rough unroaded country.  
No significant impacts anticipated at this time.

SOILS: Standard erosion control practices apply.

EJK  
12/1/88

TIMBER (Silviculture/Logging Systems):

Keep road open for admin. use.

VISUAL:

DB  
2/9/88 MINIMIZE FILL ON DOWN HILL SIDE OF RD  
DURING DESIGN PHASE. INTENT IS TO MINIMIZE  
ROAD'S VISIBILITY FROM THE SALT LAGOON.

WATER: Road does not cross any mapped streams. No anticipated water concerns.

GMJ  
11/23/88

WILDLIFE: No Wildlife Concern

LP  
11/18/88





KUIU SEIS  
ROAD LOCATION AND CONSTRUCTION RECOMMENDATIONS

ROAD NUMBER 46350

RESOURCE

RESOURCE CONSIDERATIONS/RECOMMENDATIONS

CULTURAL: No cultural resource concerns. No survey recommended.

JR  
11/17/93

FISHERIES:

RS: Planned road crosses or parallels no monitored Class 1 or 2 Attenuated.

11-21-98

LANDS:

RECREATION:

additional motorized access to forested unroaded country.  
No significant impacts anticipated at this time.

SOILS:

Avoid sidecutting on slopes in excess of 60%  
Standard erosion control practices apply.

ERK 12/14/98

TIMBER (Silviculture/Logging Systems):

Do not close road. Keep open for admin. access.

VISUAL:

No VISUAL concerns.

DE

12/3/99

WATER:

GMJ

11/23/99

No mapped streams are crossed or paralleled by planned road. No anticipated water concerns.

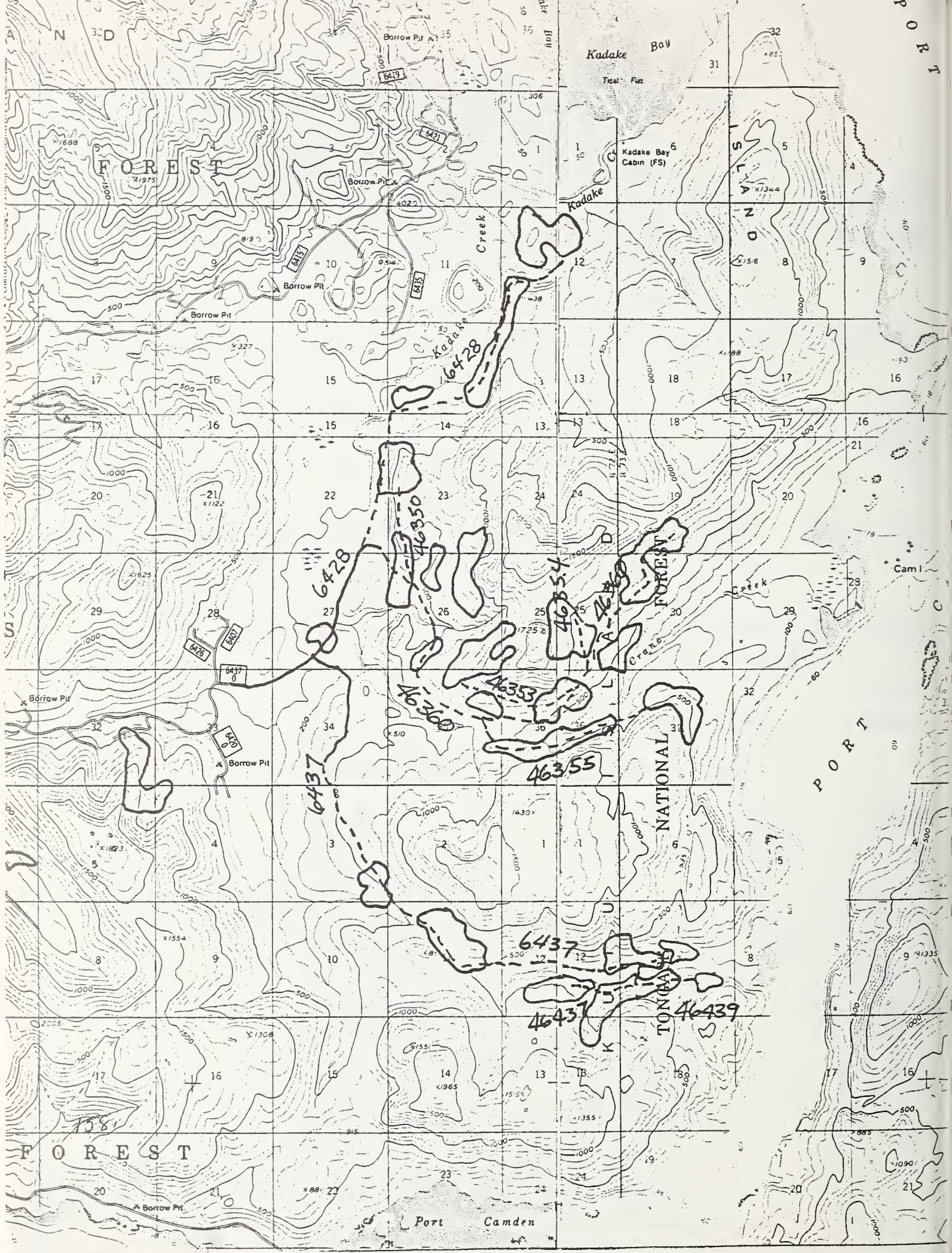
WILDLIFE:

No Wildlife Concern.

JR

12/22







KUIU SEIS  
ROAD LOCATION AND CONSTRUCTION RECOMMENDATIONS

ROAD NUMBER 46353

RESOURCE

RESOURCE CONSIDERATIONS/RECOMMENDATIONS

CULTURAL: No cultural resource concerns. No survey recommended.

JR  
11/17/88

FISHERIES:

RSA Planned road crosses or parallels no inventoried Class 1 or 2 AHMUs.  
11-21-88

LANDS:

RECREATION:

additional motorist access to previously unroaded country  
No significant impacts anticipated at this time.

SOILS: Avoid sidecasting on areas with side slopes in excess of 60% gradient.

ESK 12/14/88 Standard erosion control practices apply.

TIMBER (Silviculture/Logging Systems):

Do not close roads. Keep open for admin. access.

VISUAL:

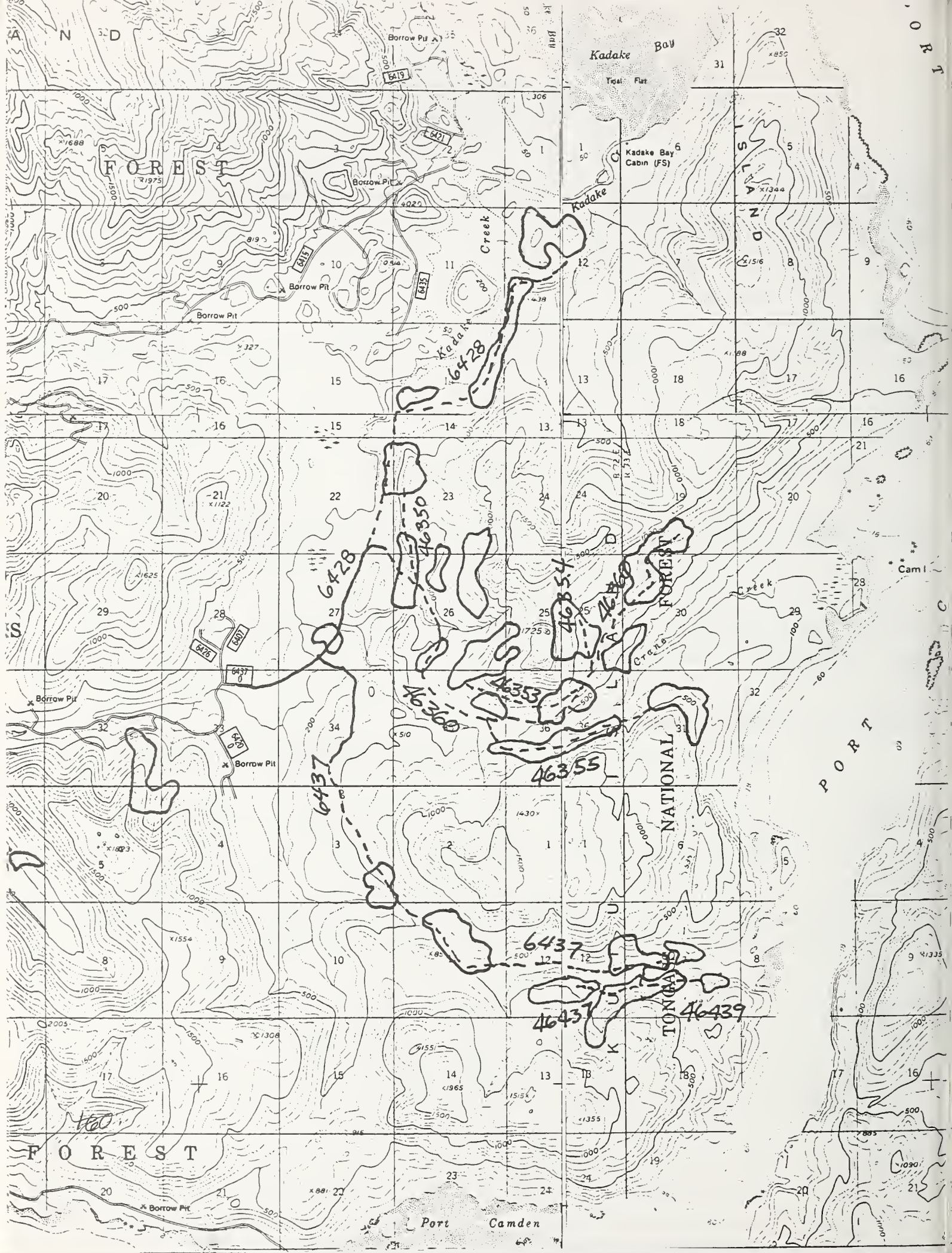
DB No VISUAL CONCERNS.

2/9/88

WATER: Planned road crosses 1 high gradient, V notch channel. side slope protection  
GMS will be needed.

WILDLIFE: No Wildlife Concerns.

XIP  
11/18/88



KUIU SEIS  
ROAD LOCATION AND CONSTRUCTION RECOMMENDATIONS

ROAD NUMBER 46354

RESOURCE

RESOURCE CONSIDERATIONS/RECOMMENDATIONS

CULTURAL: No cultural resource concerns. No survey recommended

FR

11/17/88

FISHERIES:

RSIT

Planned road crosses or parallels no ~~of~~ inventoried Class 1 or 2 AHM's

11-21-88

LANDS:

RECREATION:

Additional road access to previously unserved country.  
No significant impacts anticipated at this time.

SOILS: Avoid sidecasting on areas with side slopes in excess of 60% or greater.

28K  
12/14/88 Volcanic bedrock in this area may be poorly suited for road surface. Standard  
erosion control procedures apply.

TIMBER (Silviculture/Logging Systems):

Keep road passable for future admin. activities

VISUAL: Planned road can be seen, particularly inside harvest unit.

DB  
2/13/89 Minner Bill slope, and ~~to~~ not to locate rock source in  
this segment.

WATER: Road crosses no mapped streams. No anticipated water concerns.

GW

11/23/88

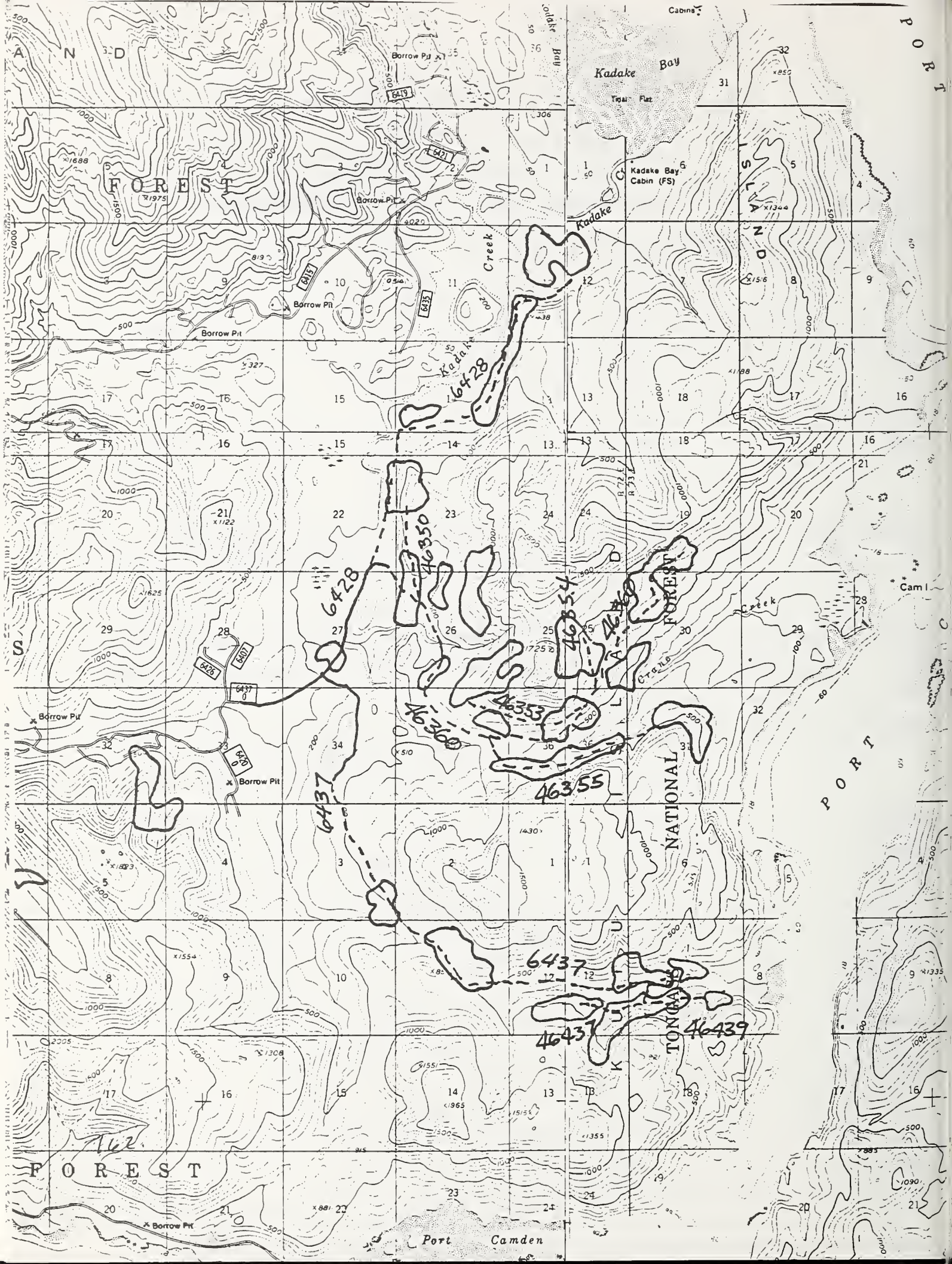
WILDLIFE:

Wildlife concerns

RF

11/2/87





KUIU SEIS  
ROAD LOCATION AND CONSTRUCTION RECOMMENDATIONS

ROAD NUMBER 46355

RESOURCE

RESOURCE CONSIDERATIONS/RECOMMENDATIONS

CULTURAL: No cultural resource concerns. No survey record. dated.

JK  
11/17/33

FISHERIES:

RSR  
11-2-88  
Planned road crosses or parallels no inventoried class 1 or class 2 Atlantic  
The crossing between units 420-3 and 420-7 is just above inventoried class  
1 habitat. Timing restrictions will be required.

LANDS:

RECREATION:

creation motorized access to previously unroaded country  
No significant impacts anticipated at this time.

SOILS: Avoid side-casting on areas with sideslopes of 60% or greater. Volcanic bedrock  
JK  
12/14/88 in this area may be poorly suited for road surface material. Standard  
erosion control practices apply.

TIMBER (Silviculture/Logging Systems):

Do not close road. Keep open for admin. access

VISUAL:

DB  
12/3/37 No visual corridor - etc.

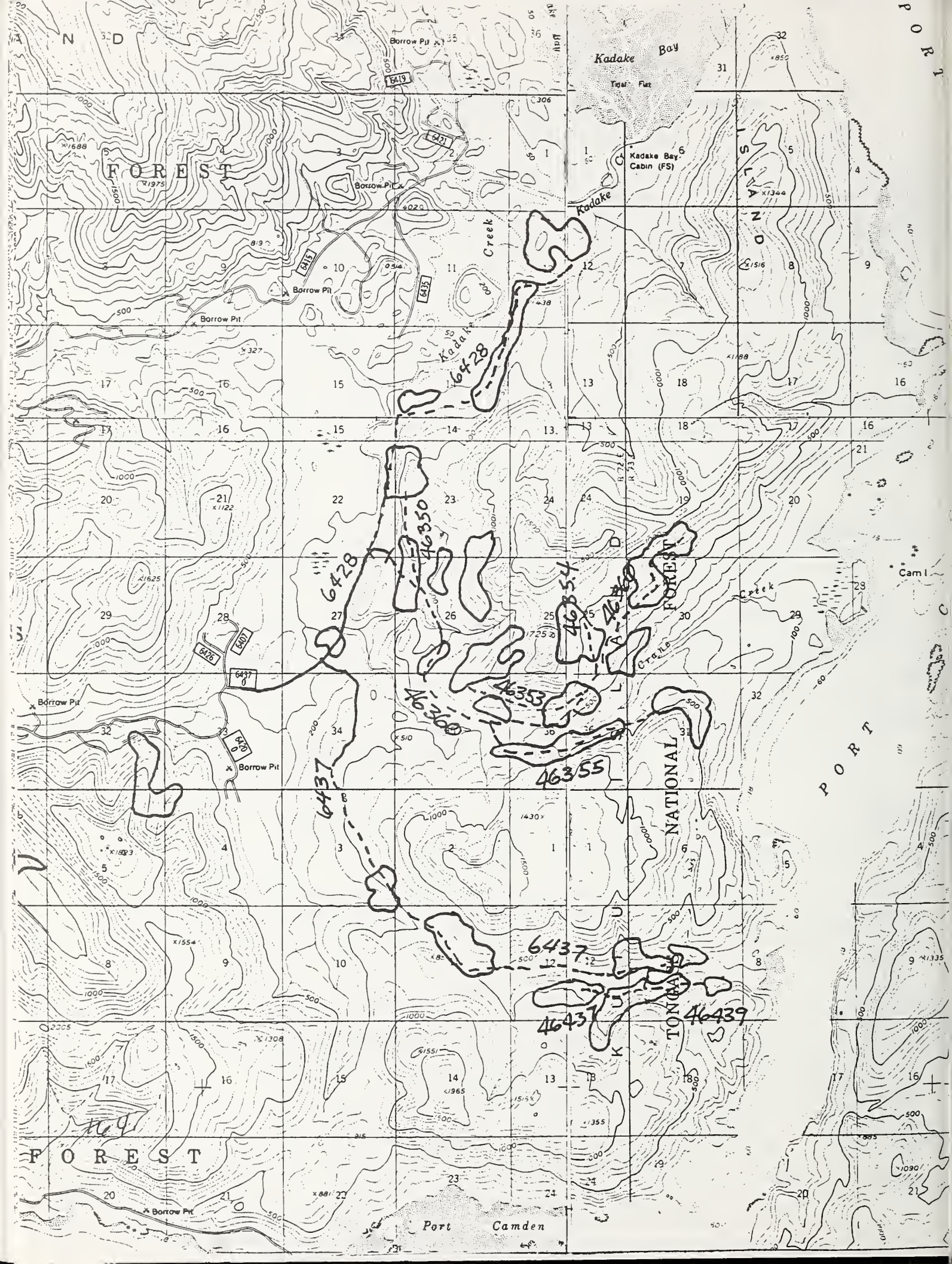
WATER: The road crosses 2 high gradient, V-notch channels. Sideslope protection will  
be needed.

GMS  
11/23/35

WILDLIFE: May give easier access to beaver trapping, waterfowl  
hunting, & deer hunting if it penetrates into  
May conflict with subsistence and wolf hunting guides.

JP  
11/18/88 IF the road goes up through the mountain  
over the ridge from road, consider seasonal  
road closure. Work with Forest & AFD 163.  
RD 8/67







KUIU SEIS  
ROAD LOCATION AND CONSTRUCTION RECOMMENDATIONS

ROAD NUMBER 46420

RESOURCE

RESOURCE CONSIDERATIONS/RECOMMENDATIONS

CULTURAL: No cultural Resource Concern. No survey recommended  
JK  
11/17/88

FISHERIES: Planned road does not cross inundated Class 1 or 2 Aquatic. Road does parallel  
RSA  
109-44-37 for several miles. Planned distance between road and creek is good, and  
11-21-88 parallel is misleading. Actual road should maintain this distance.

LANDS:

RECREATION: Additional motorized access to previously unmotorized area.  
No significant impacts anticipated at this time.

SOILS: Road is not necessary if hillside can be graded uphill to #64042?  
Standard erosion control practices apply.

TIMBER (Silviculture/Logging Systems):

Keep road open for admin. use.

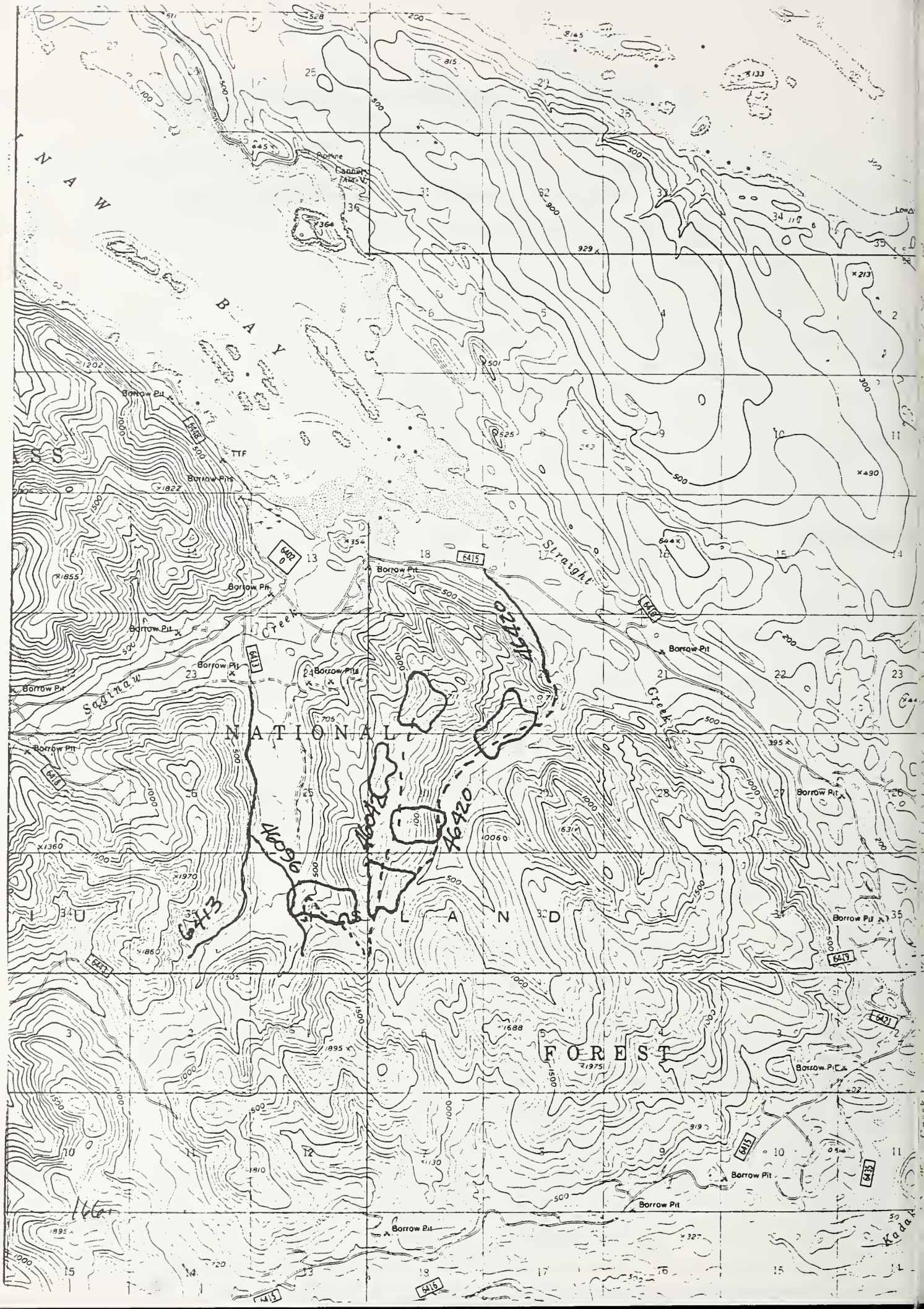
VISUAL:

B  
12/88 NO VISUAL CONCERNS.

WATER: Four high gradient channels will be crossed. Sideslope protection will be  
GMS  
11/23/88 needed.

WILDLIFE: may give easier access to areas for bear trapping  
and deer hunting if it opens up in the future.  
LP 11/21/88

IF over-forest becomes a mgt. problem  
consider Road closure with Public & AFGD.  
2D 8/87 165.





KUIU SEIS  
ROAD LOCATION AND CONSTRUCTION RECOMMENDATIONS

ROAD NUMBER 6456

RESOURCE

RESOURCE CONSIDERATIONS/RECOMMENDATIONS

**CULTURAL:** Road and LTF surveyed and cleared for cultural resources.  
See LTF File for mitigation measures agreed to by FS-SHPO.  
JR 11/17/88

**FISHERIES:** Planned road does not cross or is not parallel to inventoried class 1 or 2. Actual  
RSIA  
11-21-88 The bridge to the island may require fill on each end. The minimum amount of  
subtidal habitat should be covered with fill. The TTF is a whole analysis of its own.

**LANDS:**

**RECREATION:** Building of LTF and associated log storage will impact existing  
anchorage. Space for moorage will be limited. Provide float for  
rec. internal/commercial vessels as part of development. additional  
uninterrupted access to previously unroaded country.

**SOILS:** Standard erosion control practices apply.

EDK  
2/14/88

**TIMBER (Silviculture/Logging Systems):**

Keep road open for admin. + public use

**VISUAL:** INVOLVE Landscape Architect in all phases of LTF  
DB  
2/9/88 Design + location. A lot of work has been done in the  
past (Okawoto) which should be referenced.

**WATER:** Road will cross 2 high gradient channels which will require sideslope  
GMS  
11/23/83 protection.

**WILDLIFE:** May give easier access to beaver trapping, waterfowl  
hunting and ice hunting if it opens up in the future.  
1/12/82

For in "Tide" with Kono-mono.  
Second or Yearling road closure. All options. 107.  
8/89





KUIU SEIS  
ROAD LOCATION AND CONSTRUCTION RECOMMENDATIONS

ROAD NUMBER 46360

RESOURCE

RESOURCE CONSIDERATIONS/RECOMMENDATIONS

CULTURAL: No cultural resource concerns. No survey work required.  
JR  
11/7/88

FISHERIES: Planned road crosses over Tanager River. Tanager clause probably not required.  
RSJ  
11-21-88

LANDS:

RECREATION: Additional motorized access to preserve undeveloped country.  
No significant impacts anticipated. (Ch. 10)

SOILS: Avoid sidecasting on areas with side slopes in excess of 60%  
Standard erosion control practices apply  
Volcanic bedrock in the area may be poorly suited for roadbuilding material.  
EDK  
12/14/88

TIMBER (Silviculture/Logging Systems):

Do not close road. Keep open for admin. access.

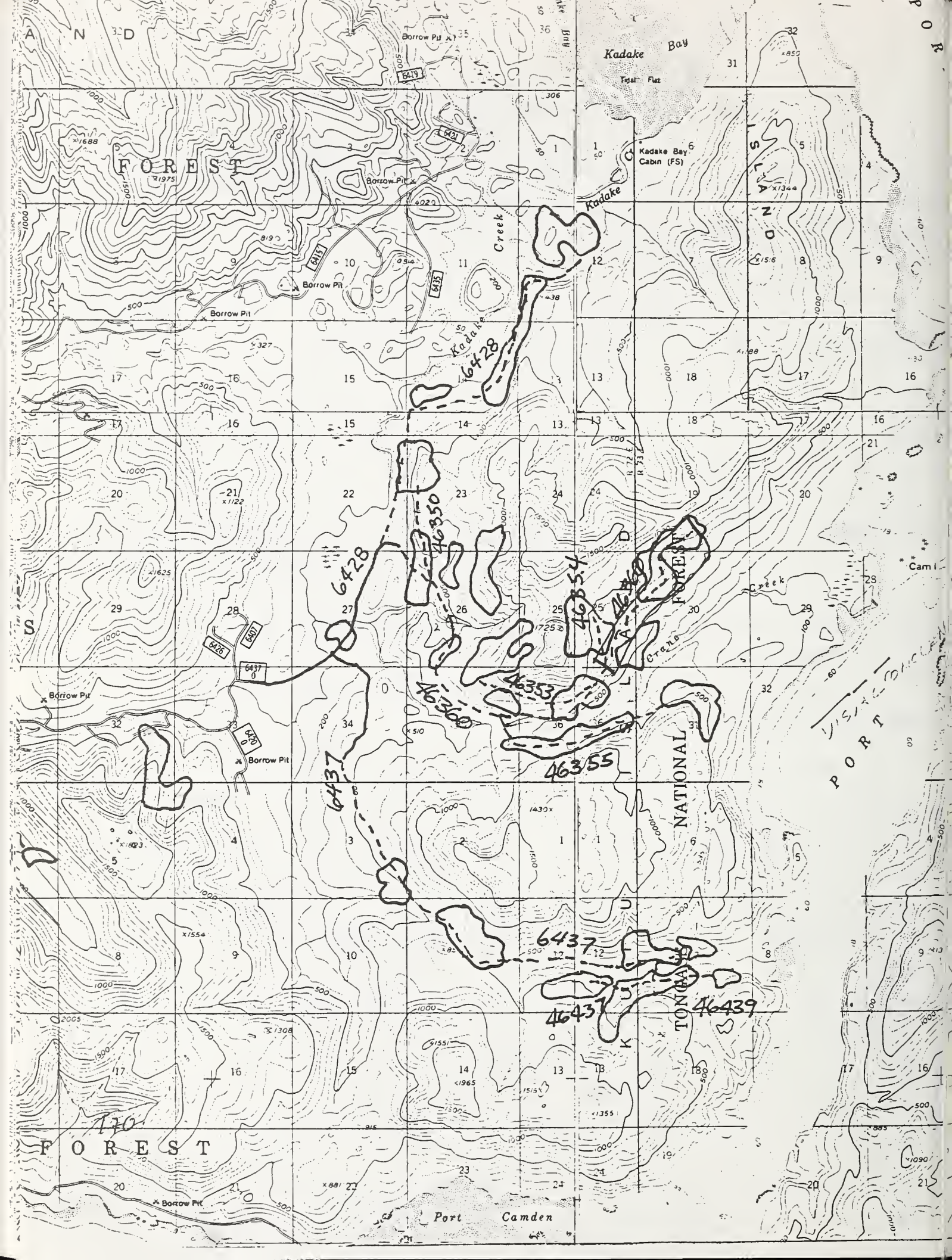
VISUAL: To be broken ground, rock source location in red clay -  
hard to have L.R. evaluate benefits of mitigation  
as seen from Pt. Landon.  
1/3/89

WATER: There are nine high gradient, V-notch channels that will be crossed.  
Sideslope protection will be needed.  
GMJ  
11/23/88

WILDLIFE: Many of the areas access to resource trapping,  
hunting & road work if it goes on  
in the future. May conflict with subsistence  
hunting guides.

JP  
11/8/88  
IF the road is on the outermost side of 169.  
Close creek, remove stream 100' down.  
Will require strict implementation with Public AFED R&F/89







KUIU SEIS  
ROAD LOCATION AND CONSTRUCTION RECOMMENDATIONS

ROAD NUMBER 46437

RESOURCE

RESOURCE CONSIDERATIONS/RECOMMENDATIONS

CULTURAL: No cultural resource concerns. No survey recommended.

LR

11/17/88

FISHERIES:

RSA

11-21-88

Planned road crosses main channel of 100-42-2. This is a Class AHMU. Timing restrictions for construction will be required.

LANDS:

RECREATION:

Additional material areas to be avoided in road cut area.  
No significant impacts anticipated at this time.

SOILS:

EEK  
12/14/88

Avoid sidestepping on areas with side slopes of 60% or greater. The volcanic rock in this area may be poorly suited for road surface material.

TIMBER (Silviculture/Logging Systems):

Do not close road. Keep open for admin. access.

VISUAL:

VB VISUAL CONCERNS

10/1/88

WATER:

GMS  
11/28/88

Road crosses low gradient floodplain channel. Streambank disturbance should be kept to a minimum. (11/82)

WILDLIFE:

No Wildlife Concerns.

AP

11/18/88



KUIU SEIS  
ROAD LOCATION AND CONSTRUCTION RECOMMENDATIONS

ROAD NUMBER 46439

RESOURCE

RESOURCE CONSIDERATIONS/RECOMMENDATIONS

**CULTURAL:** Proposed road is located within medium probability zone for cultural resources. A reconnaissance-level field inventory failed to discover any evidence of cultural resources.  
MMC  
9-17-89

**FISHERIES:** Planned road does not cross or is not parallel to any inventoried Class I WHMAs.  
ZSF  
11-21-88

**LANDS:**

**RECREATION:** Additional potential access to a remote unroaded country. No significant impacts anticipated at this time.

**SOILS:** Avoid sedimenting in areas with sideslopes greater than 60%. Volcanic bedrock in this area may be poorly suited for road surface material.  
SDK  
12/17/88

**TIMBER (Silviculture/Logging Systems):**

Do not close road. Need admin. access.

**VISUAL:**

12/3/88 NO VISUAL CONCERNS.

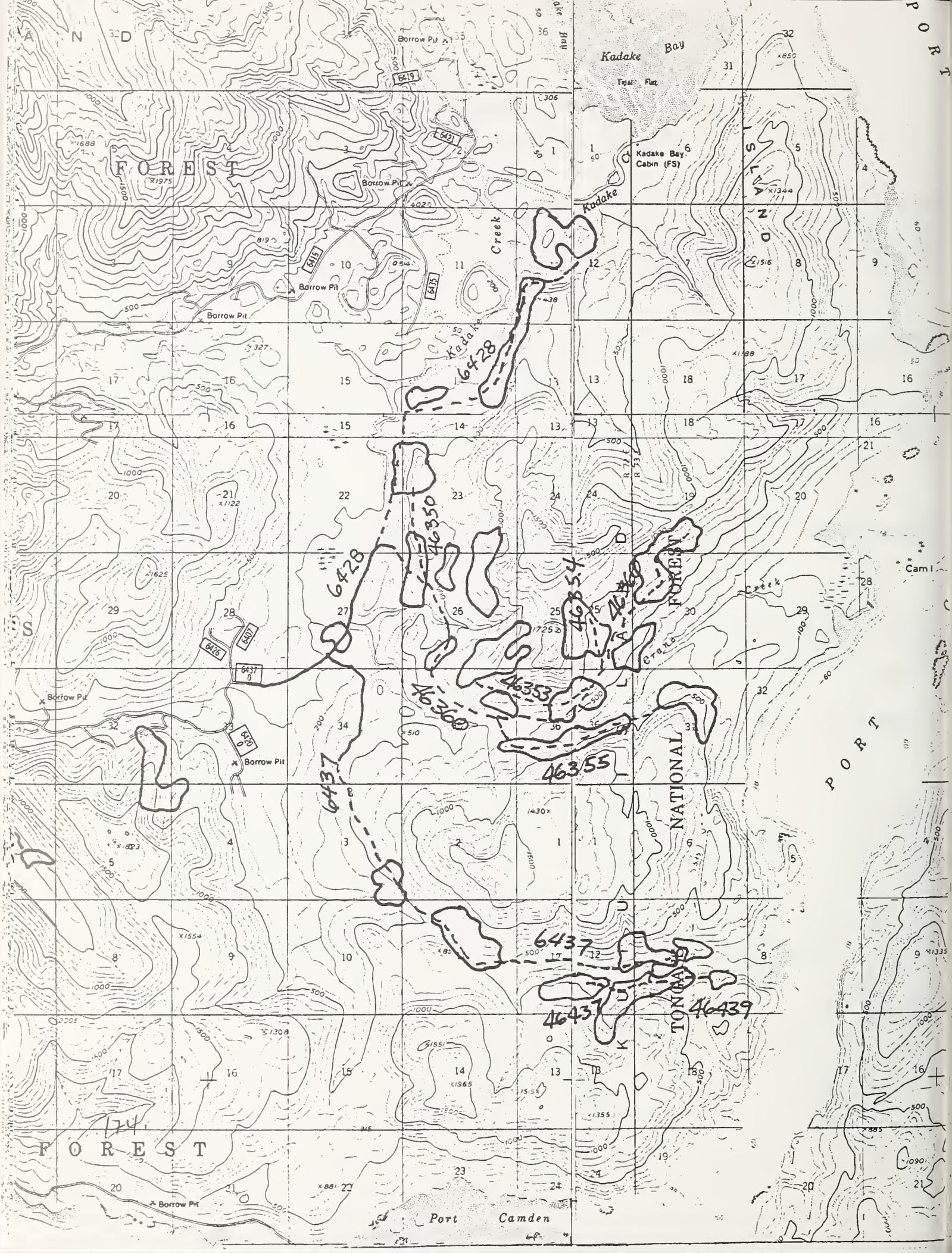
**WATER:**

6M3 Road does not appear to cross or parallel any streams. No anticipated water concerns.  
11/23/93

**WILDLIFE:** No Wildlife Concerns.

ZP  
11/12/88





KUIU SEIS  
ROAD LOCATION AND CONSTRUCTION RECOMMENDATIONS

ROAD NUMBER 6437

RESOURCE

RESOURCE CONSIDERATIONS/RECOMMENDATIONS

CULTURAL: No cultural resource concerns. No survey recommended.

JR

11/17/88

FISHERIES: Planned road crosses trib (Class 2 AHMU) within first mile. Timing restrictions not required.  
RSA  
11-21-88 Far end of road, where parallels 109-43-12 should be located as far away from stream as possible. Planned distance is more than adequate. Tributary crossings in this section will require timing to prevent downstream effects to the closely located class 1 AHMU (salmon habitat).

LANDS:

RECREATION: Additional motorized access to previously unroaded country.  
No significant conflicts anticipated at this time.

SOILS: Standard erosion control practices apply.

TIMBER (Silviculture/Logging Systems):

Do not close road. Keep open for admin. use.

VISUAL:

No visual concerns.

WATER: Six high gradient streams will be crossed. Sideslope protection will be needed. One of the streams is an alluvial fan channel & will require sufficient debris passage.  
GMJ  
11/22/88

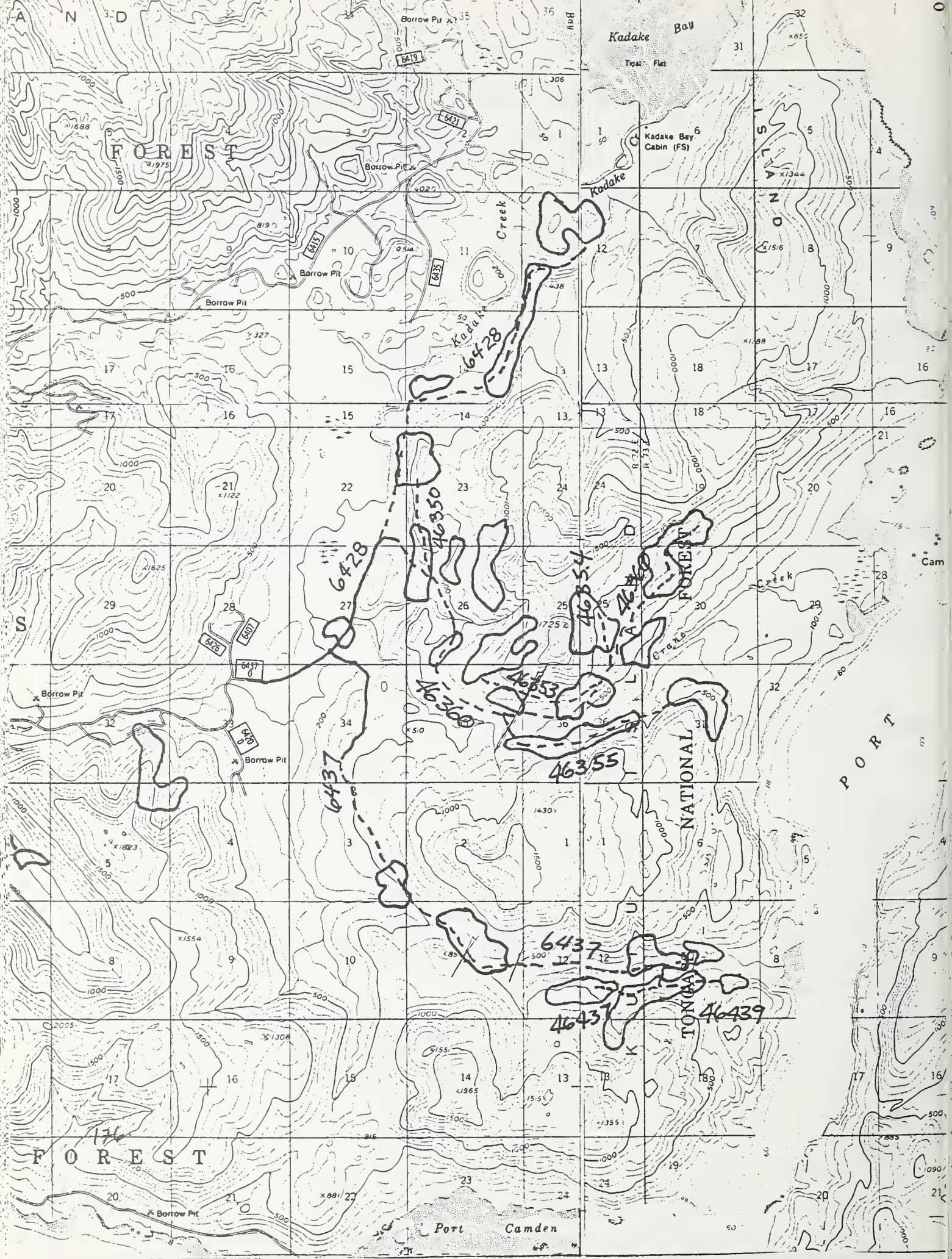
WILDLIFE: May give easier access to beaver trapping, hunting, and deer hunting if it opens up in the future.

JP

11/18/88

IF Local concerns about a problem. Seasonal road closure should be considered. Work jointly with AFGD, with public input. RD 8/89 175.







KUIU SEIS  
ROAD LOCATION AND CONSTRUCTION RECOMMENDATIONS

ROAD NUMBER 6461

RESOURCE

RESOURCE CONSIDERATIONS/RECOMMENDATIONS

CULTURAL: No cultural resources on site. No survey recommended.

LR

11/17/88

FISHERIES: Planned road crosses 6 class 1 AHAs which were identified on the hydrology inventory. See inventory for location. These crossings will likely require timing restrictions. Road parallels class 1 AHA for approx. 0.3 miles. Actual distance between stream and road should be maximized.

RSA

11-21-88

LANDS:

RECREATION:

Additional motorized access to previously undeveloped country. Easy access to hunting area north of Three Mile Arm. Monitor use, if conflicts occur, consider the installation of a gate.

SOILS:

Standard erosion control practices apply - Avoid undercutting on side slopes in excess of 60% grade in sections 12, 13 and 14.

TIMBER (Silviculture/Logging Systems):

Keep road passable for admin. access.

VISUAL: NOTE AREA OF VISUAL CONCERN. MARKED IN RED. TRY TO LOCATE ROCK SOURCES OUTSIDE THIS AREA, AS SOURCES COULD BE USEFUL FROM 2 MILE AREA. REMAINING SEGMENT NO VISUAL CONCERNS.

DE

12/8/88

WATER: There are 7 low gradient floodplain channels. Streambank protection will be needed.

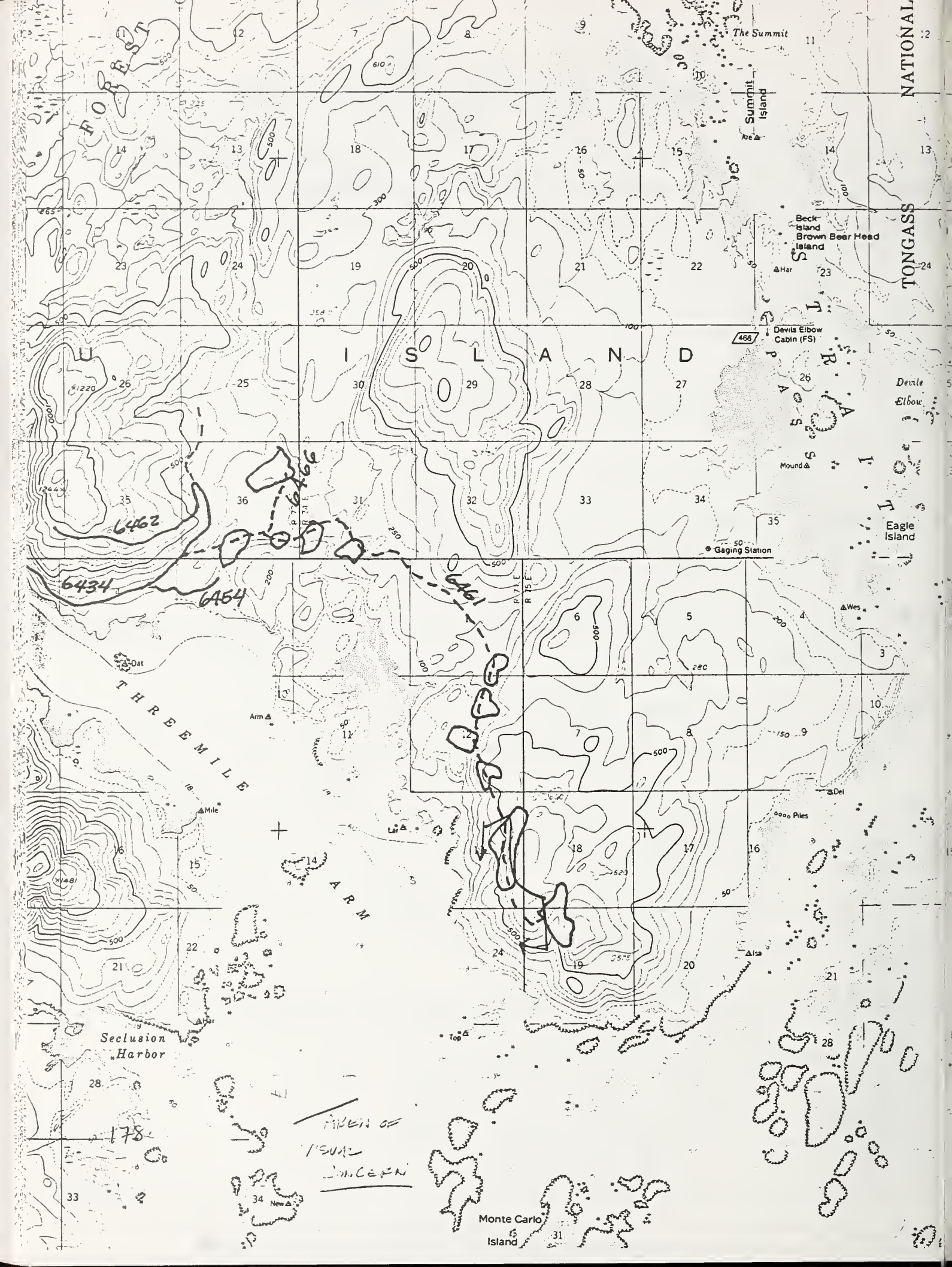
GNIS

11/23/88

WILDLIFE: May make access easier for beaver trapping, waterfowl hunting, and deer hunting if it goes up in the future.

LR

11/18/88



KUIU SEIS  
ROAD LOCATION AND CONSTRUCTION RECOMMENDATIONS

ROAD NUMBER 6466

RESOURCE

RESOURCE CONSIDERATIONS/RECOMMENDATIONS

CULTURAL: No cultural resource concerns. No survey team needed

LR

11/17/88

FISHERIES:

RSA

Planned road does not cross or is not parallel to inventoried Class I or II Aquatic

11-21-89

LANDS:

Standard erosion control practices apply.

RECREATION:

Additional motorized access to previously undeveloped country.  
No significant impacts anticipated at this time.

SOILS:

Standard erosion control practices apply.

ERK  
12/14/88

TIMBER (Silviculture/Logging Systems):

Keep road open for admin. use.

VISUAL:

No VISUAL CONCERNS

DB

12/9/88

WATER:

Road crosses no mapped streams. No anticipated water concern.

WILDLIFE:

No wildlife concerns.

LP

11/10/88





KUIU SEIS  
ROAD LOCATION AND CONSTRUCTION RECOMMENDATIONS

ROAD NUMBER 6474

RESOURCE

RESOURCE CONSIDERATIONS/RECOMMENDATIONS

CULTURAL: No cultural concerns. No survey recommended  
JR  
11/17/98

FISHERIES: The planned road does not cross or is not parallel to inventoried class 1 or 2  
RSA  
Alt. mts.  
-21-98

LANDS:

RECREATION: additional motorized access to previously unmotored country.  
No significant impacts anticipated at this time.

SOILS: Standard erosion control practices apply

JR  
12/14/98

TIMBER (Silviculture/Logging Systems):

Keep road open for admin. access.

VISUAL: Minimize fill on down hill side of road — minimize  
DB  
2/9/99 visibility on road from Salt Lagoon.

WATER: Road does not cross any mapped streams. No anticipated water concerns.

GMJ  
11/23/98

WILDLIFE: No Wildlife Concern

LP  
11/18/92







KUIU SEIS  
ROAD LOCATION AND CONSTRUCTION RECOMMENDATIONS

ROAD NUMBER 6480

RESOURCE

RESOURCE CONSIDERATIONS/RECOMMENDATIONS

CULTURAL: No cultural resource concerns. No survey recommended.  
LR  
11/17/88

FISHERIES: The planned road does not cross or is not parallel to Class 1 or 2 streams.  
RJA  
11-21-88

LANDS:

RECREATION: Additional protected access to previously recommended security.  
No significant impacts anticipated at this time.

SOILS: Standard erosion control practices apply.

TIMBER (Silviculture/Logging Systems):

Keep road open for admin. access.

VISUAL:

DB  
12/3/88 No visual concerns.

WATER: Road does not cross any mapped streams. No anticipated water concerns.  
GMS  
11/25/88

WILDLIFE: No wildlife concerns.

LR  
11/12/82



KUIU SEIS  
ROAD LOCATION AND CONSTRUCTION RECOMMENDATIONS

ROAD NUMBER 6488

RESOURCE

RESOURCE CONSIDERATIONS/RECOMMENDATIONS

CULTURAL: No cultural resource concerns, No survey deemed needed.  
JR  
11/17/83

FISHERIES: Planned road does not cross or is not parallel to inventoried Class 1 or 2  
RSH  
-21-33  
Attm's.

LANDS:

RECREATION: additional motorized access to previously unroaded country  
No significant impacts anticipated at this time.

SOILS: Standard erosion control practices apply

TIMBER (Silviculture/Logging Systems):

Keep road open for admin. use

VISUAL:

DB No visual concerns - Broken topo will visually  
10/99 RD RLOG ACTIVITIES.

WATER: Road crosses one high gradient stream, sideslope protection will be  
GMS  
11/23/88  
needed.

WILDLIFE: No Wildlife Concern

11/2/83





# **Appendix A-2**

## **Unit Modifications: Reasons and Impacts**





Unit #	Planned AC	Cut AC	Difference AC	Old* Gwth	Reason	Impact
81	94	87	-7	N	Modified to log timber isolated in planned unit & eliminate yarding across creek.	Increased utilization of available timber; Decreased impacts to stream
101	91	96	+5	N	To pick up timber isolated in planned unit & reduce blowdown	Improve utilization of timber
102	116	150	+34	N	Addition in order to uphill yard "V-notches", change in road location	More efficient layout for yarding. No difference in impacts from EIS
105	88	104	+16	N	Unit 105 now consists of the leave strip between 105 & 106. Result is a more wind firm boundary; eliminates need to yard across creek.	Decreased risk of soil damage & risk of losing timber volume due to breakage; Reduce impacts to stream
106	66	-0-	-66	N	Combined with unit 105.	Increased economy for operator & reduced risk of soil damage & timber volume loss due to blowdown
107	128	134	+6	N	To harvest timber isolated by planned unit	Increased utilization of available timber
108	62	60	-2	N	To reduce potential impact on stream	Decrease in potential impact to water quality and habitat
109	116	120	+4	N	To improve yarding efficiency & eliminate yarding adjacent to "V" notch stream channels	Improve economics and reduce impact to streams
110	132	114	-18	N	To reduce road construction & improve economics	Decreased road building this period & improved economy
113	123	140	+17	N	To harvest timber isolated by planned unit	Increase utilization of available timber
114	43	53	+10	Y	To avoid flood plain soils & make unit match ground conditions	Decrease risk of soil damage & impacts to fisheries resource.
115	64	70	+6	Y	To adjust planned unit to fit ground conditions	Improved logging layout - No change from impacts in EIS
116	15	22	+7	Y	To reduce risk of blowdown along stream	Reduced risk of blowdown & resultant soil damage and negative impact to stream water quality & fish habitat
117	94	60	-34	Y	To eliminate area dominated by cliffs and limestone sink holes & leave a buffer around a beaver pond	Safer operation for purchaser, reduced impact to stream due to elimination of stream crossing; Reduced impact on beaver pond area
118	85	114	+29	N	Reduced risk of blowdown & to better fit overall logging plan for area	More efficient logging operation. Reduced risk of soil damage & timber volume loss due to blowdown
122	124	118	-6	N	Reduce risk of blowdown & to fit overall log plan	Decrease risk of soil damage & loss of timber through breakage due to blowdown
123	45	81	+36	N	To make unit boundaries more windfirm and to replace volume lost in other unit reductions.	Improved overall logging economy
124	160	160	-0-	N	Minor adjustments to fit unit to ground	Reduce soil damage.
125	136	152	+16	N	Reduce risk of blowdown & match unit to ground	No change from impacts in EIS
						Improved harvest operation over long term - no isolated timber or difficulties created for future entry

\* old Growth habitat condition areas shown in yellow on 86-90 FEIS harvest maps.

APC UNIT MODIFICATIONS FROM 81-86 FEIS

Unit #	Planned AC	Cut AC	Difference AC	old* Growth	Reason	Impact
126	131	117	-14	N	Match unit to ground & fit overall logging plan	Reduced risk of damage due to blowdown; Improved future harvest entries
127	130	133	+3	N	Modified to eliminate yarding across stream & better fit unit to overall logging plan	Reduced impact to fish stream & Reduced risk of blowdown & Improved harvest economy
128	89	86	-3	N	Eliminate oversteepened slopes	Reduced risk of soil damage
131	26	38	+12	Y	Fit unit to overall logging plan & ground conditions	Increased utilization of timber
133	32	23	-9	Y	Maintain buffer strip along fish stream	Reduced impacts on fish stream
150	39	41	+2	Y	Reduce risk of blowdown	Increased utilization of timber; No change from impacts in EIS
151	14	20	+6	Y	Harvest timber isolated by planned unit	Increased utilization of timber; No change from impacts in EIS
159	89	83	-6	N	Minor changes to fit ground conditions	No change from impacts in EIS
160	88	78	-10	N	Reduce risk of blowdown	No change from impacts in EIS
86	135	136	+1	N	Modified to avoid yarding across stream channel & reduce risk of blowdown	Reduced risk of soil damage in V notch and along streams; Increased utilization of timber
94	76	107	+31	N	Reduce blowdown and better fit overall logging plan	Reduced risk of soil damage & improved utilization of timber; Improved logging economics
95	58	58	-0-	N	Modifications to fit ground conditions	No change from impacts in EIS
103	121	131	+10	N	Reduce risk of blowdown	Reduce risk of soil damage & loss of timber volume to breakage
104	39	42	+3	N	To fit planned unit to ground conditions	No change from impacts in EIS
140	18	-0-	-18	N	Deleted to reduce visual impact in LUD II Per implementation of Tongass LMP.	Reduced visual impact from Bay of Pillars Allowed operations to conform with new Land Management Plan.
141	11	-0-	-11	N	Deleted to reduce visual impact in LUD II per implementation of Tongass LMP.	Reduced visual impact from Bay of Pillars Allowed operations to conform with new Land Management Plan.
120	123	111	-12	N	Modified to fit ground conditions & include low vol. stand & to exclude steep slopes	Harvest more low volume stands; Reduced risk of soil damage
112 N	120	54	-20	N	Original unit #112 was split into two units	Reduce impacts to stream habitat
112 S	46	46	-0-	N	to maintain buffer strip along stream	
Total	3121	3139	+18			
Total Additions			+254			
Total Deletions			-236			
			18	Ac net change		
Additions in Old Growth Habitat			+43			
Deletions in Old Growth Habitat			-43			
			0	Ac net change		

\* Old Growth habitat condition areas shown in yellow on 86-90 FEIS harvest maps.

APC Unit #	86-90 EIS Unit	EIS Ac	Harvested Ac	Difference	Old* Gwth	Reason	Impact
115 A 399	2	72	80	+8	N	Error in original EIS acres. Modified to match ground conditions	no change from impacts in EIS
116 A 399	3	55	58	+3	N	To reduce risk of blowdown	Reduced risk of soil damage & loss of timber volume due to breakage
117 A 399	4	56	32	-24	Y	To eliminate cliffs & increase buffer strips along stream	Improved safety during operations; Reduced risk of impacts on stream habitat
182 399	10	58	Not Yet Released		N		
181 399	11	150	140	-10	N	Modified unit to reduce blowdown risk & leave buffer along creek.	Reduced risk of blowdown (soil damage & timber breakage); Improve stream protection for fish habitat & water quality
180 399	22	68	60	-8	Y	Minor changes to reflect ground conditions	No difference from EIS
178 399	30	167	167	-0-	N	Modified unit to prevent blowdown & eliminate yarding across creek	Reduced risk of blowdown (soil damage & timber vol loss); Reduce impacts on stream habitat
114 A 399	31	20	35	+15	Y	To replace vol. lost by deleting Unit #114 B	No change from impacts in EIS. See comments for Unit 114 B
114 B 399	1	15	-0-	-15	Y	Combined with unit 114 A	Reduces impacts to class I AHMU.
171 400	9	103	84	-19	N	To avoid yarding across stream channel	Reduced impact to stream channel (less soil damage)
170 400	12	54	46	-8	Y	To increase beach fringe leave area & eliminate scrub	Increase area retained for wildlife
179 400	24	46	60	+14	N	Due to error in EIS calculation, unit modified to improve economics	No change from impacts in EIS
173 400	25	67	99	+32	Y	To reduce visual impact & risk of blowdown	Lower impact visually & reduced risk of blowdown i.e. lower risk of soil damage & timber loss
174 400	26	62	62	-0-	Y	Modified to reduce risk of blowdown	Reduce risk of soil damage; No change from impacts in EIS
175 400	27	59	Not Yet Released		Y		
176 400	28	63	57	-6	Y	Error in EIS acre calculation.	Reduced 6 acres during harvest to reduce impacting water quality in privately owned watershed, visuals, and wildlife deer winter range
177 400	29	110	134	+24	Y	To reduce risk of blowdown	Reduced risk of volume loss (breakage) and of soil damage
162 402	1	77	92	+15	Y	To harvest timber isolated by planned unit & replace volume lost by reduction in unit #164	Increases visibility of unit from Rowan Bay

\* Old Growth habitat condition areas shown in yellow on 86-90 FEIS harvest maps.



APC Unit VCU	86-90 Unit	EIS Ac	Harvested Ac	Difference Ac	Old* Grwth	Reason	Impact
163	402	2 45	80	+35	Y	To eliminate oversteepened slope, maintain a leave strip between #162 & #163, increase beach fringe leave area, & replace vol. lost by reducing unit 164	Reduced risk of soil damage & timber breakage Increase wildlife habitat retained; Increase visibility of unit from Rowan Bay
164	402	3 141	52	-89	Y	Eliminate setting to maintain leave strip between units #163 & 164; Dropped setting to eliminate need for bridge and stream crossing	Reduced visual impact of unit as seen from Rowan Bay; improved economics of unit and reduced impact on stream by eliminating crossing
165	402	4 82	93	+11	N	Lowered backline to reduce risk of soil damage & added setting to replace volume	Reduced risk of soil damage
169	402	7 108	135	+27	N	To harvest timber isolated by unit as planned & replace volume lost by reducing other units	Improved utilization of timber; no change in impacts from EIS
186	420	1 26	Not Yet Released		Y		
184	420	2 46	37	-9	Y	Error in EIS calculations	No change in impacts in EIS
185	420	4 71	Not Yet Released		Y		
183	420	5 21	Not Yet Released		Y		
166	421	3 86	84	-2	N	Increased buffer strip along creek & replaced volume.	Reduced risk of impacting stream side habitat and water quality
167	421	5 101	90	-11	N	Eliminated oversteepened slopes; harvest volume isolated by planned unit	Reduced risk of soil damage
168	421	6 153	168	+15	N	Modified to eliminate required skyline yarding, replace volume on other side of unit, & increase buffer strip along stream	Improved economy of yarding operation, reduced impacts to stream
172	421	8 50	46	-4	N	To eliminate oversteepened slopes	Reduced risk of soil damage
Totals				6			
Total additions				+199			
Total deletions				-205			
				-6			
				-6 Net Ac changes			
Total addition in Old Growth Habitat				+121			
Total deletion in Old Growth Habitat				-159			
				-38			
				-38 Net Ac changes (more habitat remaining)			

## APC BLOWDOWN UNITS

APC Unit #	VCU	Unit	EIS Ac	Harvested Ac	Difference	**	Reason	Impact
536				10	-0-	N	To salvage blowdown	
511				26	-0-	N	To salvage blowdown & create windfirm boundary	
526				11	-0-	N	To salvage blowdown	
529				9	-0-	N	To salvage blowdown	
542				14		N	To salvage blowdown	
552				8		Y	To salvage blowdown	
554				22		N	To salvage blowdown	
527				40		N	To salvage blowdown	
530				9		N	To salvage blowdown	
541				12		N	To salvage blowdown	
553				33		N	To salvage blowdown	
512				13		N	To salvage blowdown	
547				30		N	To salvage blowdown	
504				63		N	To salvage blowdown	
510				52		N	To salvage blowdown	
Total additions				452 Ac				
Total additions in Old Growth Habitat conditions				+8 Ac				

\* Old Growth habitat condition areas shown in yellow on 86-90 FEIS harvest maps.









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